"A CLINICAL STUDY ON VENTRAL HERNIAS"

Dissertation submitted to

THE TAMILNADU DR. M.G.R MEDICAL UNIVERSITY

CHENNAI

In partial fulfilment of regulations

For award of the degree of

M.S (GENERAL SURGERY)

BRANCH – 1

KILPAUK MEDICAL COLLEGE

CHENNAI-600 010

April 2015

BONAFIDE CERTIFICATE

This is to certify that the work entitled **"A CLINICAL STUDY ON VENTRAL HERNIAS"** is a bonafide work performed by **Dr.VINODH.D**, post graduate student, Department of General Surgery, Kilpauk Medical College, Chennai-10, under guidance and supervision in fulfilment of regulations of the Tamilnadu Dr.M.G.R Medical University for award of M.S. Degree Branch I (General Surgery) during the academic period from May 2012 to April 2015.

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DECLARATION

I solemnly declare that this dissertation **"A CLINICAL STUDY ON VENTRAL HERNIAS"** was prepared by me at Government Royapettah hospital and Kilpauk Medical College and Hospital, Chennai, under the guidance and supervision of **Prof P. N. Shanmugasundaram M.S,** Professor and Head of Department of General Surgery, KMCH and **Prof. R. Kannan, M.S.,** Professor and Unit Chief, Government Royapettah Hospital, Chennai.

This dissertation is submitted to **The Tamil Nadu Dr. M.G.R. Medical University, Chennai** in partial fulfilment of the University regulations for the award of the degree of **M.S. Branch I (General Surgery)**.

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Date: **VINODH. D**

INSTITUTIONAL ETHICAL COMMITTEE
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Ref.No.2212/ME-1/Ethics/2014 Dt:03.04.2014.
CERTIFICATE OF APPROVAL

The Institutional Ethical Committee of Govt. Kilpauk Medical College, Chennai reviewed and discussed the application for approval "A Clinical Study on ventral hernias" – For Project Work submitted by Dr.D.Vinodh, MS (GS), PG Student, KMC, Chennai-10.

The Proposal is APPROVED.

The Institutional Ethical Committee expects to be informed about the progress of the study any Adverse Drug Reaction Occurring in the Course of the study any change in the protocol and patient information /informed consent and asks to be provided a copy of the final report.

GOVT. KILPAUK MEDICAL COLLEGE
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30/5/14.

CHAIRMAN,
Ethical Committee
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A CLINICAL STUDY ON VENTRAL HERNIAS

By Vinodh Duraisami

"A CLINICAL STUDY ON VENTRAL HERNIAS"

Dissertation submitted to THE TAMILNADU DR. M.G.R MEDICAL UNIVERSITY CHENNAI **In partial fulfilment of** regulations **For** award of **the degree of M.** S (GENERAL **SURGERY) BRANCH** 13

– 1 KILPAUK MEDICAL COLLEGE CHENNAI-600 010 April 2015 BONAFIDE CERTIFICATE This is to certify that the work entitled "A CLINICAL STUDY ON VENTRAL HERNIAS" is a bonafide work performed by Dr.VINODH.D, post graduate student, Department of General Surgery, Kilpauk Medical College, Chennai-10, under guidance and supervision in fulfilment of regulations of the Tamilnadu Dr.M.G.R Medical University for award of M.S. Degree Branch I (General Surgery) during the academic period from May 2012 to April 2015. Prof. N. Gunasekaran., M.D., D.T.C.D., The DEAN Government Kilpauk Medical College Chennai - 600 010. Prof. P.N.Shanmugasundaram,

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Finally, I wholeheartedly thank **all my patients** for their active co-operation in this study, without which this would not have become a reality.

VINODH. D

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INTRODUCTION

DEFINITION:

Hernia:

A hernia is defined as an area of weakness or complete disruption of the fibro muscular tissues of the body wall. Structures arising from the cavity contained by the body wall can pass through, or herniate, through such a defect. While the definition is straightforward, the terminology is often misrepresented. It should be clear that hernia refers to the actual anatomic weakness or defect, and hernia contents describe those structures that pass through the defect. These hernias are basically classified into two types, depending upon their visibility.

a) External hernias are those which are visible from outside, like inguinal, incisional, femoral, epigastric.

b) Internal hernias are those which are not visible from outside, they may be present between two adjacent cavities such as abdomen and thorax and they may herniate into a sub compartment of a pre-existing cavity.

Ventral Hernia:

Are those hernias, which occur through the anterior abdominal wall. The anterior abdominal wall is the site of a variety of hernias due to man's erect posture which renders the anterior abdominal wall weak. Almost all these hernias protrude through the abdominal wall to form palpable swellings.

These hernias mainly present as a swelling and they rarely go for complications like strangulation, incarceration and present with respective manifestations. Commonly hernias do not require any special investigations to diagnose them. (Clinically diagnosed) rarely they need investigations like computerized tomography, ultrasound and herniography to confirm the diagnosis.

AIMS OF THE STUDY

1. To study the various etiologies of ventral hernias.
2. To determine the age distribution, sex ratio & clinical presentation of individual hernias.
3. To evaluate the recurrence rates between different treatment modalities and study the contributory factors.

REVIEW OF LITERATURE

The word Hernia is derived from the Greek word (Hernias, bud) meaning an offshoot, a budding or bulge. The Latin word Hernia means rupture or tear. Hernia was recognized about 1000 years ago. Probably the reason for this is the upright position which man has assumed during the revolutionary process. Hernia was treated by several ways with the available simple measures like bandages, ointment, poultices and localized concoctions. Cutting and countering operations were common in India, China and Japan long before Hippocrates.

Omphalocele was well known to Ambrose pare who described in his book 'The Works published in 1634. Astly Cooper (1804) was the first person to report the successful treatment of exompholos and he was the originator of one stage repair of small omphalocele.

Astley Cooper discovered the Transversalis Fascia and pointed out that this layer was the main barrier to herniation.

Lucas Championnere apparently was one of the first to use the overlapping fascia technique in 1891.

Arroyo and coworkers in Spain performed one of the very few randomized clinical trials with 200 patients. Their results showed a clear distinction between the success of using mesh repair and primary suture. The

latter resulted in a recurrence rate of 11% while after using a tension free mesh repair is amounted to only 1%.

INCISIONAL HERNIA:

Witzel (1900), Goepel (1900), Barlett (1903) and McGavin (1909) advocated the use of Silver wire filigree.

Koontz and Throckmorton (1948) used Tantalum Gauze.

Fascia Lata grafts used in the form of strips of sheets have been reported.

Shortly the advent of synthetic Plastic sheets and the polyvinyl alcohol sponge were used.

The Modern era of prosthetic hernia repair began in 1958 when Usher reported his experiment with Polyamide mesh. Later braided polyester mesh, polypropylene mesh and expanded polytetrafluoroethylene (ePTFE) were introduced which revolutionized the surgery for post-operative Hernia.

HISTORY OF SURGICAL MESHES:

Artificial material was introduced in 1889 by Witzel who used a mesh of silver wire for abdominal wall hernias.

In 1959, Usher et al. reported the successful implantation of surgical meshes at first in 13 dogs and afterwards inpatients with abdominal wall hernias.

Busse in 1901 even used meshes made of gold wire.

In 1940, Ogilvie published the use of cloth mesheds to treat contaminated gun shot wounds with defects of the abdominal wall.

In 1949, Preston took meshes of metallic wire to treat hernia patients.

HISTORIC OVERVIEW OF MESH REPAIR

No.	Event	Introduction
1	Polyester mesh	Wolsten Holme Arch Surg., 1956, 73, 1004
2	Polypropylene mesh	Usher Arch. Surg. 1962;84;325
3	GPRVS	Stoppa et al., 1973 (72)
4	Trans-inguinal preperational prostheses	Rives et al., chirurgie, 1973; 99:564.
5	Subfascial prosthesis to Lichtenstein	Lichtenstein and Schulman, 1986(44)
6	Preperitoneal prosthesis by Extraperitoneal access	Nyhus et al., An. Surg., 1988; 208:733. Wantz,Surg.,1989;169:408
7	Mesh plug	Rutkow/Robbins Surgery, 1993; 114:3.
8	Plug Laparoscopy	Shultz et al., clin. Laser Mon., 1990;8:103
9	Intraperitoneal onlay mesh prosthesis (IPOM) Transabdominal preperitoneal prosthesis (TAPP)	Shultz et al., clin. Laser Mon., 1990;8:103 Corbitt, Surg. Laparos Endose, 1991; 1:23.
10	TEPP	Ferzil etal.,laparosendcsc,Surg., 1992;2:281 McKerna Laws, Surg. Endosc, 1993; 7:26.

PARAUMBILICAL HERNIA:

Celsus in the first century A.D used an elastic suture in the treatment of umbilical hernias.

Willian J Mayo, on Aug 4th 1898 delivered his classical paper, remarks on a radical cure of hernia. He instituted the new classical technique of overlapping fascia for repair of umbilical hernia.

In 1979 Usher described a technique of repair using Marlex Mesh.

EPIGASTRIC HERNIA:

Epigastric hernias were first described in 1285.The term epigastric hernia was introduced by Leveille in 1812.

The first successful operation on this hernia was reported by Maunnior in 1802.

Ulrike Muschaweck in 2003 concludes using a Mesh plug in an epigastric hernia has advantages over the commonly used methods.

SPIGELIAN HERNIA:

Adrian van den spighel (1578-1625) a Flemish anatomist was first to describe the semi lunar line (linea spigelii).Spontaneous rupture along the semi lunar line as first described by klinkosh (1764), who referred to this condition as hernia in the linea semilunaris.

EMBRYOLOGY

The abdominal wall begins to develop quite early in the embryo, but it does not achieve its definitive structure until the umbilical cord separates from fetus at birth. Most of the abdominal wall forms during closure of the midgut and reduction in relative size of the body stalk.

The primitive wall is somatopleure (ectoderm and mesoderm without muscle, blood vessels, or nerves). The somatopleure of the abdomen is secondarily invaded by mesoderm from the myotomes that developed on either side of the vertebral column. This mesodermal mass (hypomere) migrates ventrally and laterally as a sheet, and the edges differentiate while still widely separated from each other into the right and left rectus abdominis muscles. The final opposition of these muscles in the anterior midline closes the body wall.

Before the primordial of the rectus muscles fuse anteriorly, the mesoderm from the hypomere splits into three layers that can be recognized by the seventh week of development. The inner sheet differentiates into the transverses abdominis muscle, the middle sheet becomes the internal oblique muscle and aponeurosis. Dorsally, the superior and inferior posterior serratus muscles develop from the superficial layer of the hypomere.

Approximation of the two rectus abdominis muscles in the midline proceeds from both caudal and cranial ends and is complete by the 12th week, except at the umbilicus. The final closure of the umbilical ring awaits the separation of the cord at birth, but the ring may remain open in which case an umbilical hernia is present. Most such hernias gradually close spontaneously.

ANATOMY OF THE ANTERIOR ABDOMINAL WALL

ANTERIOR ABDOMINAL WALL:

The anterolateral abdominal wall is a complex musculoaponeurotic structure.it is bounded by the flare of coastal margins and xiphoid process of sternum above and by the iliac crests, inguinal ligaments and pubis below.

The structures that comprise the anterior abdominal wall are skin, subcutaneous tissue, superficial fascia, antero-lateral muscles of the abdomen, together with their enveloping fascial sheaths and aponeurosis, transversalis fascia, extra peritoneal adipose and areolar tissue and parietal peritoneum.

The linea alba, a tendinous raphe in the midline divides the anterior abdominal wall into two parts. The umbilicus lies in the anterior median line, at the level of the disc between third and fourth lumbar vertebrae.

I. SUPERFICIAL FASCIA:

The fascia contains fat, cutaneous nerves, cutaneous vessels and superficial lymphatics.

Below the level of umbilicus fascia is divided into a superficial fatty layer (fascia of camper) and a deep membranous layer (fascia of scarpa). Most part of the fascia is a single layer that contains variable amount of fat.

II. CUTANEOUS NERVES

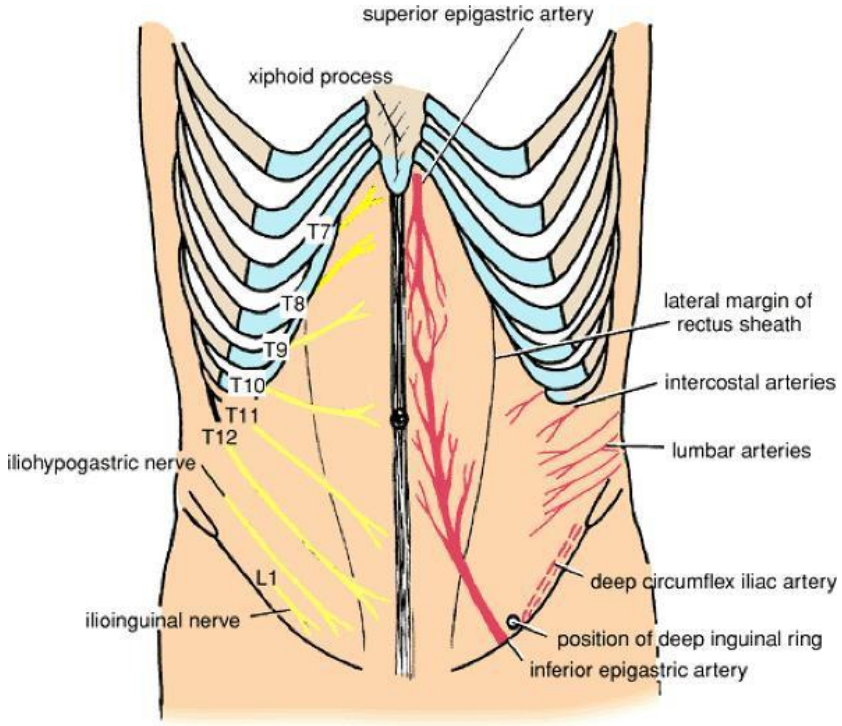
Skin of anterior abdominal wall is supplied by the lower six thoracic nerves and by the first lumbar nerve.

III..CUTANEOUS ARTERIES AND VEINS

Anterior cutaneous arteries are branches of superior and inferior epigastric artery and accompany the anterior cutaneous nerves. Lateral cutaneous arteries are branches of the lower intercostals arteries and accompany the lateral cutaneous nerves. Superficial epigastric, superficial external pudendal, superficial circumflex iliac artery arise from the femoral artery and supply the skin of the lower part of abdomen. The venous drainage is by superficial epigastric, superficial external pudendal, superficial circumflex iliac vein which drains into femoral vein.

The venous drainage corresponds to arteries

FIGURE NO.1



SEGMENTAL INNERVATION OF THE ANTERIOR ABDOMINAL WALL AND ARTERIAL SUPPLY TO THE ANTERIOR ABDOMINAL

IV. SUPERFICIAL LYMPHATICS

Above the level of the umbilicus, the lymphatics run upwards to drain into the axillary lymphnodes. Below the level of umbilicus they run downwards to drain into superficial inguinal lymphnodes and pay respect to the watershed line.

ANTERIOR ABDOMINAL WALL MUSCLES:

1. THE EXTERNAL OBLIQUE MUSCLE:

This muscle is largest and thickest of the flat abdominal muscles. Its broad origin includes the last seven ribs, the thoracolumbar fascia, the external lip of iliac crest and the inguinal ligament that inserts into pubic tubercle. The muscle belly gives way to a flat, strong aponeurosis at about the midclavicular line, and it inserts medially into the linea alba. The aponeurosis passes anterior to sheath of rectus abdominis and with care, it can be dissected from it. In general the fascicles pass from the superolateral to inferomedial. Thus the direction of force generated by contraction is superolateral. The nerve supply of this is from ventral rami of lower six thoracic spinal nerves.

2. THE INTERNAL OBLIQUE MUSCLE:

It originates from the last five ribs, the thoracolumbar fascia, and the intermediate lip of the iliac crest and the lateral half of the inguinal ligament. Its fibers course opposite the direction of those of external oblique. It gives way to a flat aponeurosis medially, which splits to enclose the rectus muscle. The aponeurosis reunites medial to the rectus and inserts into the linea alba. The posterior lamina ends below in a free curved margin called arcuate line midway between umbilicus and symphysis. The fibres that arise from lateral half of the

Inguinal ligament pursue a downward course and insert into os pubis between symphysis and the tubercle. Some of the lower fibres are pulled into the scrotum by the testis as it passes through the abdominal wall and called the cremastric muscles of the spermatic cord. The Nerve supply of this is from Ventral rami of lower six thoracic and first lumbar spinal nerves.

3. THE TRANSVERSUS ABDOMINIS MUSCLE:

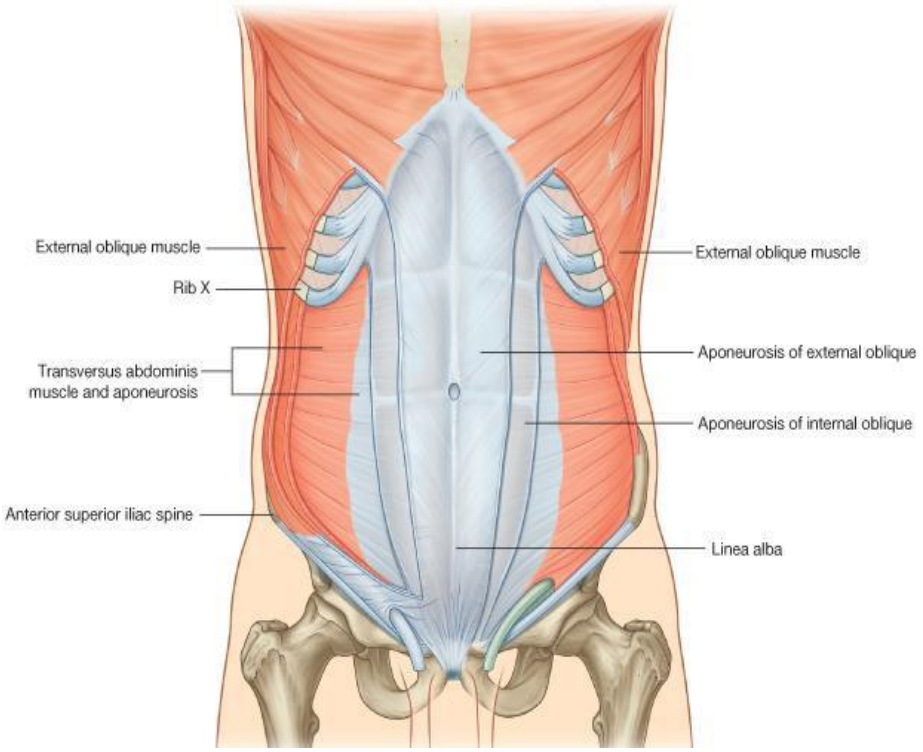
It is the smallest of the three flat muscles and originate from lower five ribs, the Thoracolumbar fascia, the internal lip of iliac crest, and the lateral third of the inguinal ligament. The direction of its fibers is transverse and they give way to a flat aponeurosis that inserts into the linea alba. The aponeurosis passes behind the rectus sheath in its upper two-third. The fibers that originate from inguinal ligament pass downward to insert into os pubis, as do the fibers of the internal oblique. Occasionally, the lower fibers of both muscles inserts by means of a common tendon called conjoint tendon. The nerve supply is from the Ventral rami of lower six thoracic and first lumbar spinal nerves.

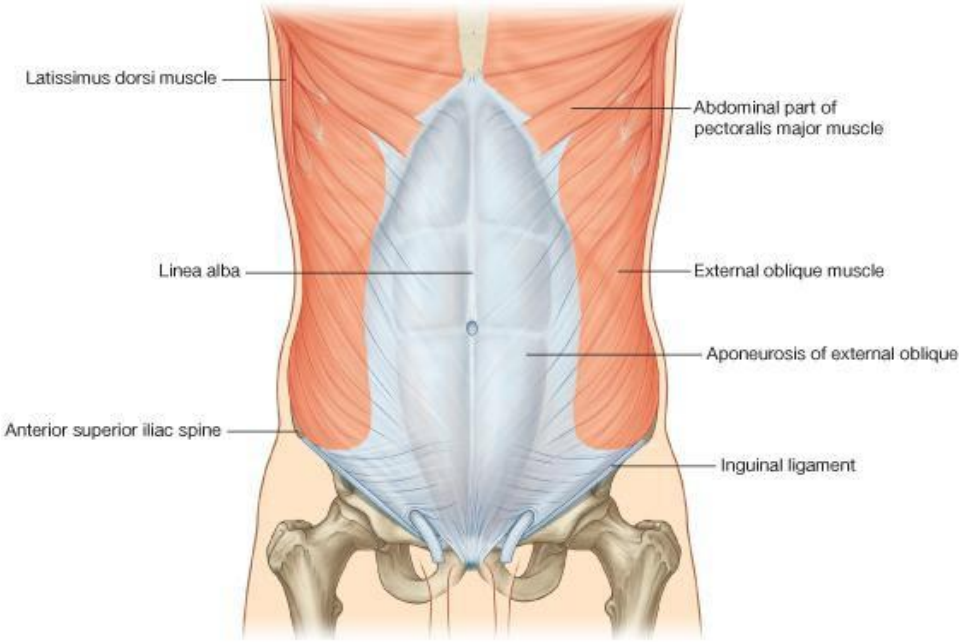
NOTE: The neurovascular plane of the abdominal wall lies between the internal oblique and transverses abdominis.

The spigelian fascia is the aponeurotic part of transverses abdominis muscle between the medial border of its muscular part and the insertion of the aponeurosis into the posterior rectus sheath.

MUSCLES OF THE ANTERIOR ABDOMINALWALL

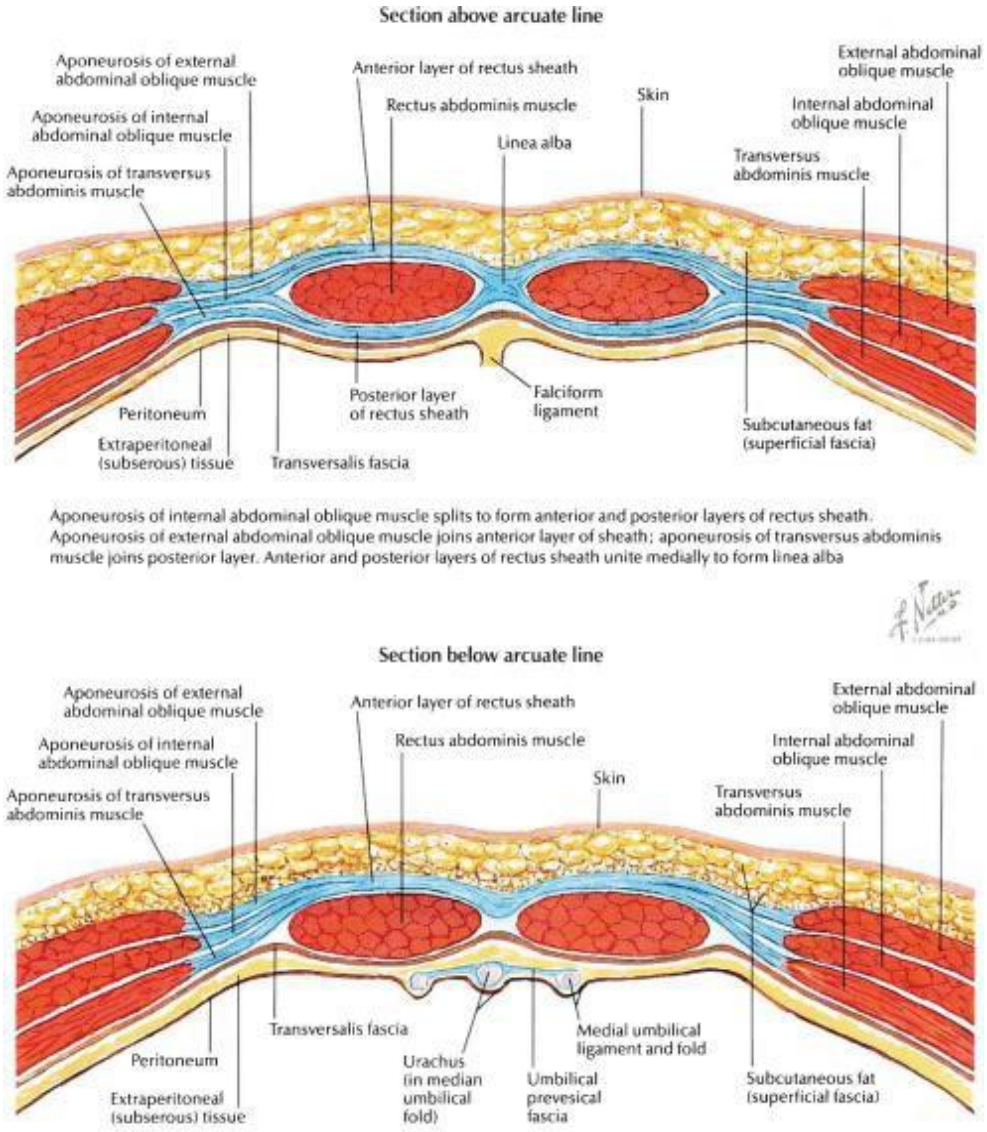
FIGURE NO 2





MUSCLES OF ANTERIOR ABDOMINAL WALL(CROSS-SECTION)

FIGURE NO 3



MUSCLES OF THE ANTERIOR ABDOMINAL WALL

FIGURE NO 4

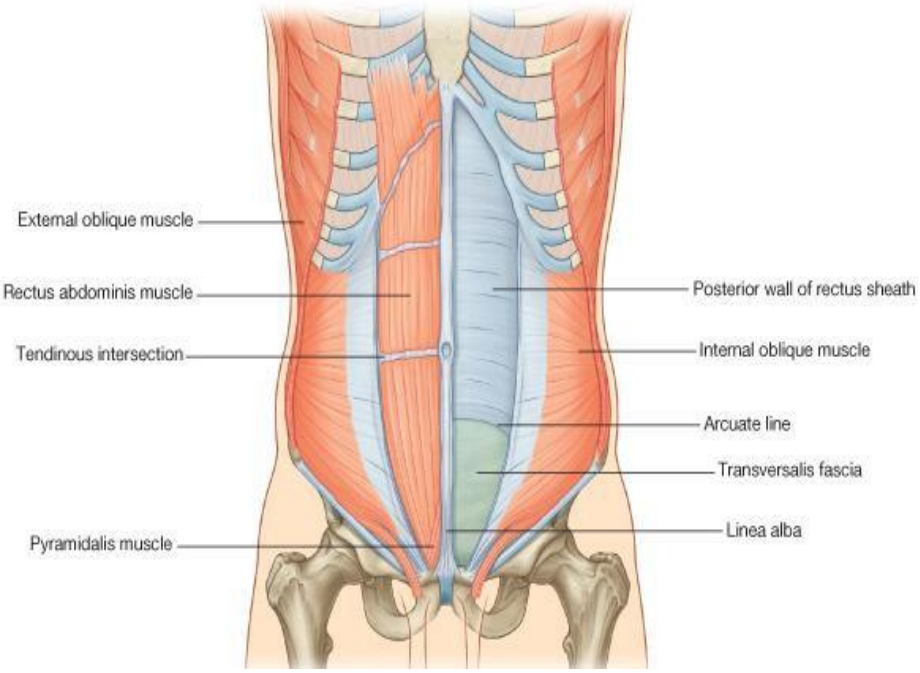
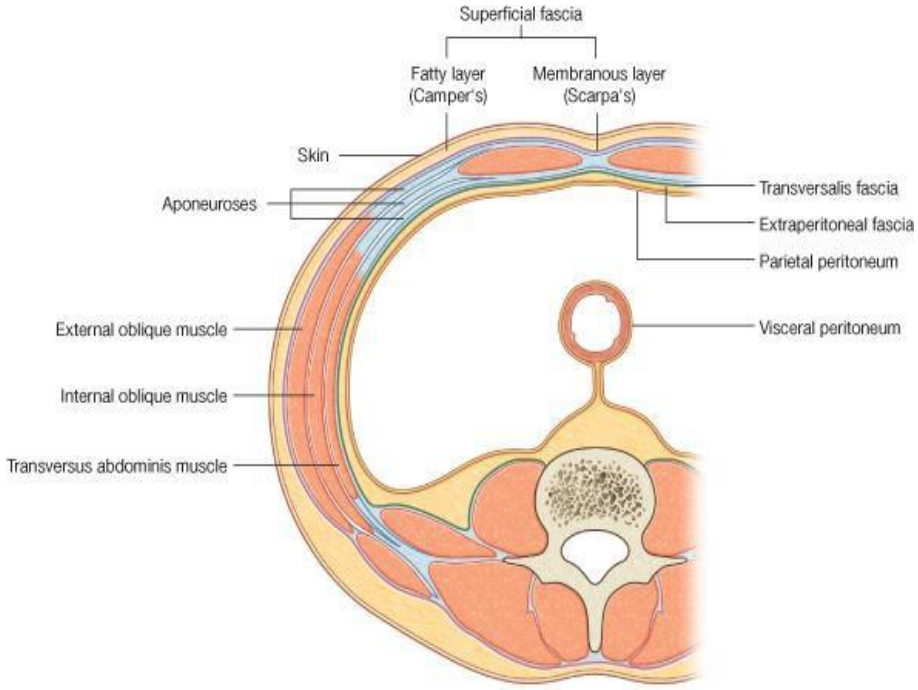


FIGURE NO 5 MUSCLES OF THE ANTERIOR ABDOMINAL WALL

(TRANSVERSE SECTION)



4. THE RECTUS ABDOMINIS MUSCLE:

It is a long strap like muscle which arises from two tendinous heads. The lateral head arises from the lateral part of pubic crest, the medial head from the anterior pubic ligament. The fibers run vertically upwards and get inserted into xiphoid process, seventh, sixth and fifth costal cartilages.

The nerve supply is from the Ventral rami of lower six or seven thoracic spinal nerves.

5. THE CREMASTER MUSCLE:

The muscle is fully developed only in the male. In female it is represented by a few fibers only. Along with the intervening connective tissue, the muscle loops form a sac like cremastric fascia around spermatic cord deep to external spermatic fascia.

The nerve supply is from the Genitofemoral nerve which is derived from first and second lumbar spinal nerves.

6. THE PYRIMIDALIS MUSCLE.

It is a rudimentary muscle in human beings. This is a small triangular muscle arising from anterior surface of body of pubis. Fibers pass upwards and medially to be inserted into linea alba.

The nerve supply is from the Subcostal nerve which is the ventral ramus of the twelfth thoracic spinal nerve.

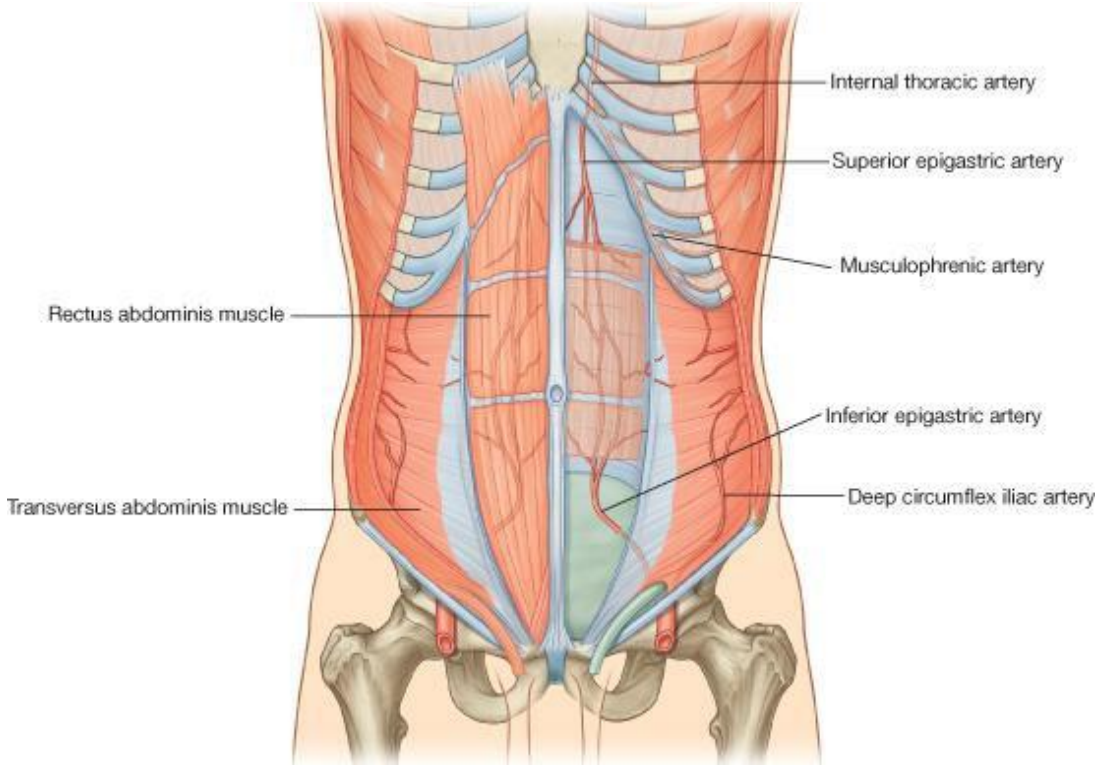
7. DEEP ARTERIES AND VEINS OF ANTERIOR ABDOMINAL WALL

The anterior abdominal wall is supplied by superior epigastric and musculophrenic artery above, inferior epigastric and deep circumflex iliac artery below, small branches of lower two or three posterior intercostal, subcostal and lumbar arteries, superficial epigastric, circumflex iliac artery. The venous drainage is by superior epigastric and musculophrenic vein below, inferior epigastric and deep circumflex iliac vein below.

FIGURE NO 6

DEEP ARTERIES AND VEINS OF

ANTERIOR ABDOMINAL WALL



8. DEEP NERVES OF THE ANTERIOR ABDOMINAL WALL

The anterior abdominal wall is supplied by lower and six thoracic nerves and by first lumbar nerve through its iliohypogastric and ilioinguinal branches.

9. FUNCTIONS OF ANTERIOR ABDOMINAL WALL MUSCLES:

The abdominal muscles provide a firm but elastic support for the abdominal viscera against gravity. This is chiefly due to the tone of the oblique muscles, especially the internal oblique. They are also accessory muscles of respiration.

The oblique muscles assisted by the transversus, can compress the abdominal viscera and thus help in all expulsive acts, like micturition, defecation, parturition, vomiting.

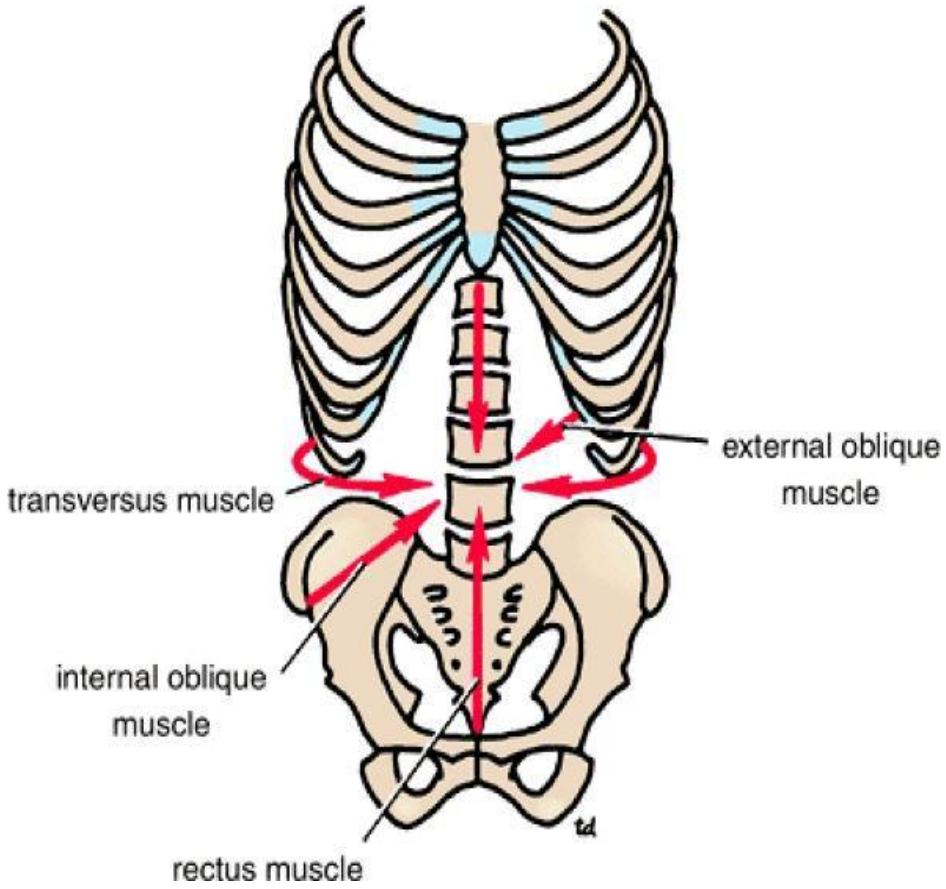
The external oblique can markedly depress and compress the lower part of the thorax producing forceful expiration, as in coughing, sneezing, blowing, shouting.

Flexion of the lumbar spine is brought about mainly by the rectus abdominis.

Lateral flexion of the trunk is done by one sided contraction of the oblique muscles.

Rotation of trunk is by action of external oblique with opposite internal oblique.

FIGURE NO 7: PICTURE SHOWING FUNCTIONS OF ABDOMINAL WALL MUSCLES



10. RECTUS SHEATH:

This is an aponeurotic sheath covering the rectus abdominis muscle. Above the costal margin the anterior wall is formed by the external oblique aponeurosis, posterior wall is deficient. Between the costal margin and the arcuate line anterior wall is formed by external oblique aponeurosis and anterior lamina of the aponeurosis of the internal oblique, posterior wall is formed by

posterior lamina of the aponeurosis of the internal oblique and aponeurosis of the transverse muscle. Below the arcuate line anterior wall is formed by aponeurosis of all the three flat muscles. The aponeurosis of the transverses and internal oblique are fused, but the external oblique aponeurosis remains separate. There is deficiency of posterior wall.

CONTENTS:

The rectus abdominis muscle

The pyramidalis muscle

External oblique

Transverses muscle muscle

Internal oblique muscle rectus muscle

The superior epigastric artery and veins

The inferior epigastric artery and veins

The terminal parts of lower six thoracic spinal nerves

The aponeurosis of the transverses and internal oblique are fused.

The external oblique aponeurosis remains separate. Posterior wall remains deficient.

11. LINEA ALBA:

The linea alba is a tendinous raphe formed by interlacing fibers of the three aponeurosis forming the rectus sheath. It extends from the xiphoid process to the pubic symphysis

. Above the umbilicus it is about 1 cm wide, but below the umbilicus it is narrow and difficult to define. It is so called because it is a white line.

12. FASCIA TRANSVERSALIS

This fascia lines the inner surface of the transversus abdominis muscle. It is a continuous lining of the abdominal cavity and is considered to be the strongest layer of the abdominal wall.

Deep inguinal ring is an oval opening in the fascia transversalis.

Anteriorly, it is adherent to the linea alba above the umbilicus. Posteriorly, it merges with the anterior layer of the thoracolumbar fascia and is continuous with the renal fascia. Superiorly, it is continuous with the diaphragmatic fascia. Inferiorly, it is attached to the inner lip of the iliac crest and to the lateral half of the inguinal ligament. At both these places it is continuous with the fascia iliac. Medially, it is attached to pubic tubercle, the pubic crest and the pectineal line. Part of it is prolonged into the thigh as the anterior wall of the femoral sheath.

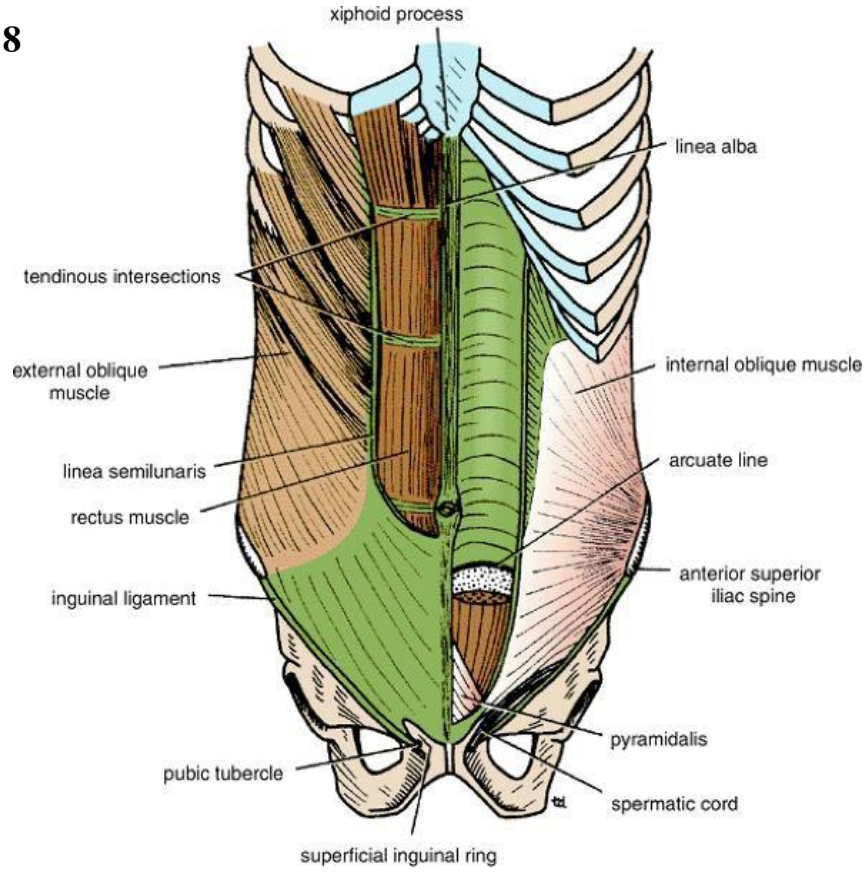
13. CONJOINT TENDON

It is formed from lower fibres of internal oblique and lower part of aponeurosis of transverse abdominis. It is attached to pubic crest and pectineal line. It descends behind the superficial inguinal ring and acts to strengthen the medial portion of the posterior wall of the inguinal canal.

14. INGUINAL LIGAMENT

It is the thick, in rolled lower border of the aponeurosis of external oblique and stretches from anterior superior iliac spine to the pubic tubercle. Its grooved abdominal surface forms the floor of the inguinal canal.

FIGURE NO 8



ANTERIOR VIEW SECTION OF THE ABDOMINIS MUSCLE AND THE RECTUS SHEATH.

15.EXTRAPERITONEAL ADIPOSE AND CONNECTIVE TISSUE LAYER

It contains adipose tissue, inferior epigastric artery and vein and fetal structures, medial umbilical ligaments (obliterated umbilical artery), obliterated urachus (median umbilical ligament), ligamentum teres (obliterated umbilical vein).

16. PARIETAL PERITONEUM

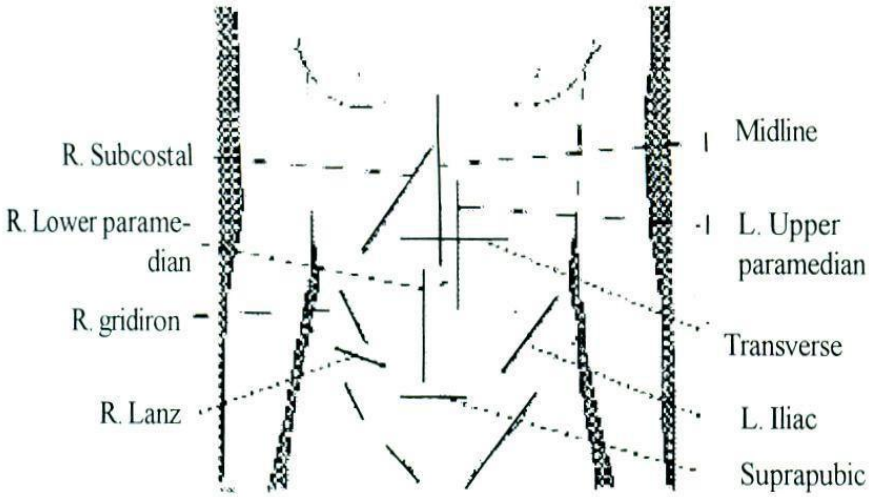
It is the inner most layer of the abdominal wall. It is a thin layer of dense irregular connective tissue and is covered on the inside by a layer of simple squamous mesothelium. The peritoneal membrane is innervated from above downward in a sequential manner by spinal nerves T7-L1. The peritoneum provides little strength in wound closure, but it affords remarkable protection from infection if it remains unviolated.

ANATOMY 0F UMBILICUS:-

The umbilicus is a cicatrix which represents the site of entry of the umbilical cord in the fetus. The floor of the umbilicus is formed by the fibrous tissue. The scar is directly adherent to the superficial fascia, because the fatty tissue ceases at the margin of the umbilical ring. Deep to this are situated the inter lacing transverse fibers known as "umbilical fascia". The fetal umbilical vessels and urchins create a weak spot through which protrusion of viscous can occur. The most frequent point of exit of a hernia is a site of the umbilical veins represented in the adults by the attachment of a ligamentum teres.

FIGURE NO 9

THE ANATOMY OF ABDOMINAL INCISIONS



Abdominal Incisions

Incisions through the abdominal wall are based on certain anatomical principles. The intra-abdominal pressure is considerable and the surgeon aims at leaving the abdominal wall as strong as possible after operation, Otherwise there exists a real fear that a portion of abdominal contents may leave the abdominal cavity through the weak area which is caused by a badly placed incision resulting in hernia. The principles governing abdominal incisions are;

1. The incision must give ready access to the part to be investigated and should admit extension if required.
2. Provided the necessary access can be obtained splitting the muscles in the line of its fibers (fleshy or aponeurotic). is preferable to division.

3. The incision must be transverse, as the scar left in the peritoneum is best protected by muscle.
4. The rectus muscle may be cut transversely without seriously weakening the abdominal wall, as such a cut passes between two adjacent nerves without injuring them. The rectus has a segmental nerve supply so that there is no risk of a transverse incision cutting of the distal part of the muscle from its nerve supply, as would obtain if a muscle was divided which depend on a single nerve.
5. The incision must divide no nerves.
6. The openings made by the cut through the different layers of the abdominal wall must as far as possible not be super-imposed.

CLASSIFICATION OF VENTRAL HERNIA

A. Congenital – Present at birth

1. Omphalocele
2. Gastroschisis
3. Umbilical: infant

B. Acquired

1. Midline
    - Diastasis recti
    - Epigastric
    - Umbilical: Adult, Acquired, Paraumbilical
2. Median
    - Supravesical
3. Paramedian
    - Spigelian
    - Interparietal

C. Incisional

- It depends on previous operative incision

D. Traumatic

- Penetrating
- Blunt
- Destructive

INCIDENCE

Epigastric Hernia:-

They are not very common. The incidence varies from about 0.8% to as high as 7-8% of all hernias operated upon. More common in men than in children and rare in women. Mostly seen in early adulthood, middle age and also seen in multipara. Up to 20% may be multiple, but usually one is dominant Strangulation is very unusual.

Umbilical Hernia:-

Adult umbilical and Para umbilical hernias are more common in women and in obese persons. Estimates of the incidence of umbilical hernia at birth vary greatly. In Caucasian infants, they range between 10-30%. In children of African descent, it may be several times greater. Children with raised intrabdominal pressure owing to ascites, COPD, or ventriculoperitoneal shunt, also tend to develop an umbilical hernia. The incidence of Para umbilical hernia in the adult is unknown. It is more common in the female, with a female to male ratio of 3:1, middle aged, obese, multiparous females are prone to develop significant Para umbilical hernia, as are individuals with ascites, usually secondary to cirrhosis of the liver. In addition, as Mayo suggested in 1899, the old, cachectic and feeble are subject to umbilical hernia and likely to develop complications.

In his study Ghori, Jain et. al. reports the maximum incidence (41%) in female at .the age of 40 years. The adult umbilical hernia may undergo strangulation at any time. Strangulation is more common in women than in men, occurring between 40-50 years and very small number between 50-70 years. They account for 0.03% of the total hernias operated upon.

Incisional Hernia:

The frequency with which hernia results in the scar of abdominal operation is difficult to estimate and probably the figure is considerably higher than generally believed. According to Rodney maingot approximately 8% of cases subjected to abdominal operations develop Incisional hernia. In 1961 Santon reported 4.8% Incisional hernia's in a series of 500 consecutive laparotomy; With a follow up of 5-7 years. Leo. M.Zimmerman and Anson Monograph in 1953 cited that the post-operative incisional hernias constitute about 1.7% of all hernias. In 10 years prospective trial involving 337 patients Mudge and Hughes showed that of the 62 patients who developed an Incisional hernia, 56% did so after the first post-operative year and 35% manifested after 5 years.

SPIGELIAN HERNIA:

There are about 1000 case reports described about spigelian hernia. They are common in fifth or sixth decade. Both sex are affected equally. Strangulation is common. In one review of the subject, in 1984 the mean age was 50 years and the ration of women to men was 1.4: The ratio of hernias on right side to hernias on the left side was 1.6:1. The hernia was bilateral in 24 of 744 patients. In ten cases there were more than one hernia on the same. Side. Most of the hernias were located below the level of the umbilicus; only 28 were above this level. The youngest recorded patient was six days old, and the oldest was 94 years of age. Incarceration at the time of the operation occurred in 69 to 325 patients (21.2%). The hernial sac was situated subcutaneous in only 15 cases while in most cases the hernia was located between the musculoaponeurotic layers of the anterior abdominal wall.

Lawler in 1966 reported a case of incarcerated giant spigelian hernia in a 49 year old woman, the contents were omentum and the entire transverse colon. The incidence is about 1% of all abdominal hernias.

AETIO PATHO-GENESIS

The main causes for production of ventral hernia can be classified into congenital and acquired causes.

1). Congenital Causes:-

- Congenital sac, apertures in the linea alba and aponeurosis or in linea semi lunaris.
- The umbilicus is sometimes imperfectly developed at birth permitting the viscera to protrude through the umbilical cord.
- Congenital muscle defects.

2) Acquired Causes:-

The hernia may result from any condition which tends to weaken the abdominal wall or tends to increase the intra-abdominal pressure. Post-operative Incisional hernias may result from imperfect closure of peritoneum and anterior abdominal wall following laparotomy.

- Chronic strain (e.g. whooping cough in children, chronic Bronchitis, constipation, urinary out flow obstruction in adults).
- Stretching and relaxation of abdominal musculature because of increase in size of contents e.g. Obesity, Pregnancy.
- Obesity - Fat acts like a pile driver as it separates muscle bundles and layers, weakening aponeurosis and favours the outcome of hernia.
- Direct trauma - Blunt and penetrating injuries.

EPIGASTRIC HERNIA:

This is a small protrusion, usually composed of pre peritoneal adipose tissue occurring in the linea alba between the xiphoid process and umbilicus. The hernia varies considerably in size from pea nut size to a tennis ball size. It is possibly owing to lack of fibres at midline decussation which allows preperitoneal fat to be herniated between the gaps. It starts as protrusion of a lobule of fat through an abnormally wide opening for blood vessels or through a congenital defect in the linea alba and posterior rectus sheath. The fact that it is common between 20 and 50 years of age probably reflects a balance between a congenital defect and a rise of intra-abdominal pressure, adiposity, and weakening of the muscles in adults. It is more frequent in people with a wide linea alba.

Epigastric hernia is generally considered an acquired lesion, probably related to excessive strain on the anterior abdominal wall aponeurosis.

Moschowitz emphasized the importance of blood vessels perforating the linea alba and prolongation of the transversalis fascia at this point.

Askar's studies also demonstrated that fibers originating from the diaphragm traverse the upper midline aponeurosis posteriorly and join the fibers of the posterior rectus sheath and middle tendinous intersection. They attach to

the linea alba at a site midway between the xiphoid and the umbilicus. Uncoordinated vigorous, synchronous contraction of the diaphragm and upper abdomen may occur during straining and coughing. The force caused by upward traction on the diaphragm and lateral traction on the tendinous intersection would be maximal at this point of attachment midway between the xiphoid and the umbilicus, the most common site of Epigastric Hernia.

Omentum is not uncommonly found in the epigastric hernia, but stomach, colon and small intestines are rarely found in them. At the earlier stage the hernia consists of only fat and known as fatty hernia of linea alba.

UMBILICAL HERNIA:-

Hernias occurring at or around the umbilicus.

Infantile umbilical hernia

By about sixth week of intrauterine life the intestines herniate into the omphalocele because of the growth of the intestine being so much more rapid than the growth of the foetus and the abdominal cavity. By the 10th week the intestine have rotated and returned in to the abdominal cavity. By birth, the umbilical ring has closed except for the small space occupied by the umbilical vein and paired umbilical artery. When the cord gets ligated, the vessels undergo thrombosis which results in progressive closure of the umbilical ring by the scar tissue.

If the scar formation is abnormal or ring is large, herniation of the intra-abdominal contents will occur through this defect. Because of these factors there is increased incidence in premature babies of umbilical hernia formation.

Para umbilical hernia

Etiological factors can be divided into congenital and acquired factors.

Congenital:

Due to anatomical weakness, maldevelopment of abdominal wall few variations in their attachment and arrangement of abdominal muscle.

A positive relation between the pattern of aponeurotic decussating and herniation has been demonstrated by study conducted by Askar with a single midline decussating a midline hernial defect is seen. Congenital widening of the umbilical orifice predisposing factor.

Acquired:

a) Predisposing factors

1) Faulty ligation of umbilical cord

Umbilical cord ligation more 4-5cm from the abdominal wall may give rise to development of hernia.

2) Umbilical sepis- weakness umbilical area.

3) Increased intrabdominal pressure, due to chronic cough, constipation, Straining while passing urine, ascites.

4) Direct trauma.

b) Contributing factors

1. Low birth weight
2. Race
3. Sex: Female: Male=3:1
4. Family history:

Familial history contributes but no generic pattern of inheritance has been seen.

5. Age: more common in children< 2yrs and elderly people.

It occurs through a weak spot in the linea alba either above or below the umbilicus. In this type the umbilicus is normal. The exact etiology is obscure.

The most reasonable hypothesis seems to be the one given by Mayo. He considered para umbilical hernias to be caused by downward traction of the abdominal wall bearing on a fixed point at the umbilicus.

With obesity the midline is stretched laterally due to increase in intra-abdominal volume. The subcutaneous fat sags down and pulls the midline downwards. So when the midline is pulled both laterally and downwards it becomes week in the centre leading on to para umbilical hernia. This occurs more so around the umbilicus because above umbilicus the midline is formed by triple decussation of the aponeurosis of all the oblique muscles. Below the umbilicus aponeurosis of all the oblique muscle fibers are in single plane. Triple decussation is stronger than single decussation. Thus the herniation occurs in the weak single decussation.

The site of attachment of lower tendinous insertion of rectus abdominis to the lateral border of linea alba seems to be the critical spot for the development of para umbilical hernia. The hernia progresses to attain enormous size. The content may be from omentum to small bowel and large bowel. Because the fibers break unevenly, many locules develop. Because the neck is small, complications are common, because of subclinical infections adhesions within the sac is very common. Coverings of the sac are peritoneum, fibrous linea alba and skin.

6. Multiparty due to stretching and weakening of the anterior abdominal wall musculoaponeurotic layer.

7. Associated conditions-some congenital condition like mongolism cretinism, meningomyelocele, hurler's syndrome, and amourotic family idiocy may be associated with umbilical hernia. May be associated with cholelithiasis, abdominal malignancies, collagen disease, hemorrhoids, varicose veins, and cystocele.

SPIGELIAN HERNIA:-

A spigelian hernia is one that protrudes through the linea semilunaris at any point in its extent. The most common site is at the junction of linea semilunaris with the linea semi circularis of Douglas.

The spigelian hernias has also been called “Masked Hernia” because in some cases, the hernia protrudes deep to the aponeurosis of the external oblique and may be difficult to identify. Factors such as age, obesity, multiple pregnancies, straining increases intra-abdominal pressure, and paralysis have been cited as predisposing causes. Incarceration of the spigelian hernia is a frequent phenomenon, because the hernial neck, in addition to being narrow, most often is firm and fibrous.

Ageing and weight loss are generally regarded as important causative factors.

Spigelian hernia is associated with a high rate of intestinal obstruction, which can probably be explained by the combination of a small hernial opening with rigid edges and the fact that the hernia is often only diagnosed when symptoms consistent with intestinal obstruction are apparent**.**

INCISIONAL HERNIA

The post-operative ventral abdominal hernia or Incisional hernia is due to failure of lines of closure of abdominal wall following laparotomy. The approximated tissue separate and abdominal organs bulge through the gap. It is covered from inside out with peritoneum, scar tissue and skin. The hernias grow to reach enormous size and truly large hernias may contain most of the abdominal contents.

Etiology:-

There are many factors which causes failure of wound healing. The two main causes are poor surgical technique and sepsis. There are two types of Incisional hernias early and late type.

Early Hernia:-

It occurs soon after the original laparotomy closure, often involving the whole length of wound, grows rapidly. The main causes are

I. POOR SURGICAL TECHNIQUE:

1. Execution of Non Anatomical Incisions
2. Poor Wound Closure Technique
3. Usage of In-appropriate Suture Material
4. Wound closure with Tension

II. WOUND SEPSIS

III. USAGE OF DRAINAGE TUBES

IV. GENERAL CONDITION:-

Obesity, Old age, generalized weakness, hypoproteinaemia, anemia, diabetes mellitus, chronic liver failure, ascites, prolonged steroid therapy, immuno suppressive therapy, smoking and any other factor which persistently rise the intra-abdominal pressure or factors which influence the rate of Incisional hernia occurrence.

V. POST OPERATIVE COMPLICATION:-

Chronic coughs, distention of abdomen, benign prostatic hyperplasia, Stricture urethra, constipation are all factors favourable for development of Incisional hernia.

VI. TYPE OF OPERATION:-

Operation such as emergency caesarean section, explorative laparotomy for peritonitis, surgeries for pancreatic disease, surgeries for intra-abdominal malignancies, surgeries on urinary tract.

VII. POST OPERATIVE WOUND DEHISCENCE:-

Burst abdomen whether covered by skin or frank evisceration is often followed by Incisional hernia, whether re-sutured or treated by open method. This is not surprising since practically all the conditions mentioned previously are also the causal factors in burst abdomen as reported by Efron in 1965.

Late Hernias:-

These hernias develop in what apparently is a perfectly healed wound that has functioned satisfactorily for 5 to 10 or even more years after operation. The etiology is not clear. There is no obvious reason why mature collagen that has served well for a number of years should change its structure. The aging, weakening of tissue associated with increased intra-abdominal pressure are cited as factors. Collagen abnormalities with imbalance of proteolytic enzymes and its inhibitors are postulated as cause of late hernias.

CLINICAL MANIFESTATIONS

INCISIONAL HERNIA

The patient's complain of an unsightly bulge in the operation scar as well as of pain and discomfort. They often suffer from a heavy, sickening, dragging sensation aggravated by coughing and straining. In large dependent hernias, areas of skin may undergo pressure ischemic necrosis and may ulcerate, and rarely, the hernia may rupture. If the hernia strangulates, the symptoms of intestinal obstruction and ischemic bowel will supervene. There is often a history of repeated mild attacks of intestinal obstruction manifesting as colicky pains and vomiting. Intertrigo may develop in the deep crease between the hernia and the abdominal wall and the skin may become moist, infected and odorous. Obese patients with large pendulous hernias are practically immobilized and find life almost unbearable.

FIGURE NO. 10 - INCISIONAL HERNIAS

PARAUMBILICAL HERNIA

It usually develops in middle and old age and it is commonly found in case of obese females. The other symptoms are swelling and pain. This hernia soon becomes irreducible because of omental adhesions with in the sac. Gastrointestinal symptoms are common due to traction on stomach or transverse colon. It is a protrusion through the linea alba just above or just below the umbilicus and it is rounded or oval in shape, the edges are well made out, and surface is smooth. The consistency is soft when it contains intestine and firm when it contains omentum and has most expansible cough impulse.

Radiological imaging is not normally required to assist in the management of hernias. Clinical examination usually allows an accurate diagnosis. However, herniography, USG, CT and MRI scan are all established and accepted investigations for imaging hernias in cases of diagnostic uncertainty.

Some of the complications of paraumbilical hernia are skin irritation and infection and it is very common. Infection can occur in umbilicus itself due to accumulation of dirt and concretion. It can also occur in the fold of pedunculous belly due to constant sweat and mechanical irritation. Sometimes overlying skin becomes infected due to use of truss.

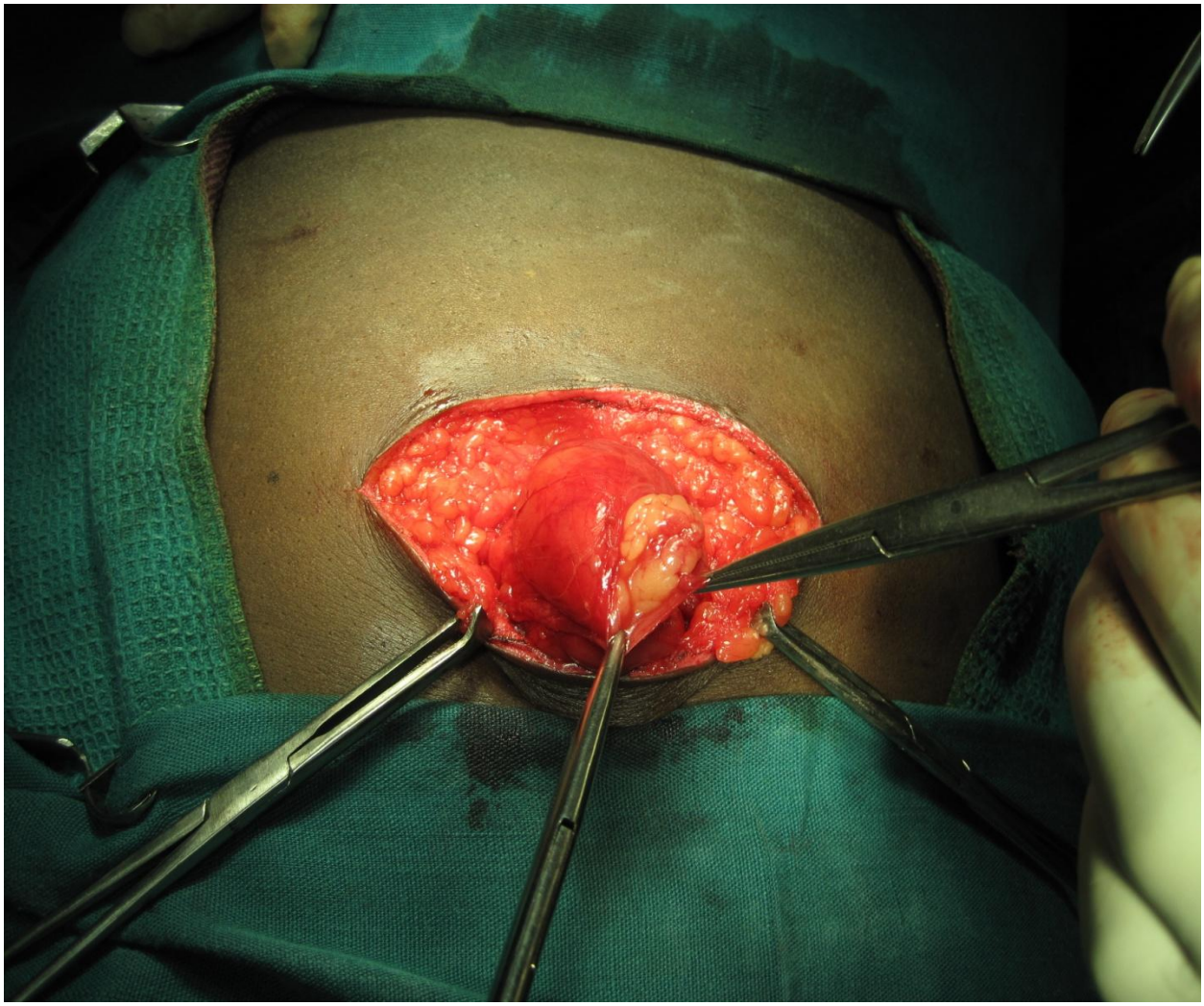
Most of the frequent complication of umbilical hernias is irreducibility. This is due to loculation with in the sac and omental adhesions with sac.

The most frequent complication of umbilical hernia is incarceration with or without strangulation; both are extremely rare in infants and children

The incidence of obstruction and strangulation in adults is 10%. Previously reducible or partially reducible can go for obstruction and strangulation. Strangulation is a frequent complication of a large Para umbilical hernia in adults, owing to the narrow neck and fibrous edge of the linea alba. Gangrene is liable to supervene unless early operation is carried out. In large hernias, the presence of loculi may result in a strangulated knuckle of the bowel in one part of an otherwise soft and non-tender hernia. Chance of obstruction is more in female patients and female: male ratio is 6:1. Pregnant women are at greater risk. Perforation is rare but intertrigo can be seen in large pedunculous umbilical hernias.

FIGURE NO: 11 -PARAUMBLICAL HERNIA

FIGURE NO:12 - PARAUMBILICAL HERNIAL SAC CONTAINING OMENTUM



EPIGASTRIC HERNIA

The usual epigastric hernia is symptom less. The patient may complain of mild or even severe pain in the mass and of exquisite tenderness to tough. The pain is exacerbated by exertion and relieved by rest in the supine position. The smaller hernias may become painful because of strangulation of the preperitoneal fat nipped by the sharp facial edges of the opening. Omentum in the sac may strangulate in which case the hernia may become swollen, painful and tender, and the overlying skin may redden. Larger hernias containing bowel may also strangulate, but this is rare.

It usually present with a small round swelling in the midline between xiphisternum and umbilicus. They are often irreducible, sometimes multiple. In obese patients the typical smooth, rounded, slightly tender lump may be lost in the depths of subcutaneous fat.

DIVARICATION OF RECTI

When the patient strains, a gap can be seen between the recti abdominis through which the abdominal contents bulge. When the abdomen is relaxed the fingers can be introduced between the recti.

SPIGELIAN HERNIA

Patients complain of pain or a lump or both at the site of herniation. The pain is sharp and constant or intermittent, or there is a dragging, uncomfortable feeling. If strangulation of the hernial contents is present, the pain will be severe or constant and associated with symptoms and signs of complete or partial (Richter) intestinal obstruction, going on to gangrene and peritonitis. Localized perforation into the sac may cause an abdominal wall abscess and even fistula.

When a soft, reducible mass, lateral to rectus is present along the semilunar line, especially below the umbilicus, the diagnosis becomes easier. The defect in the fascia may be felt which is usually tender on palpation.

MANAGEMENT

INVESTIGATIONS

As all patients of ventral hernia need surgical intervention they are evaluated medically by assessing their general condition for which routine blood investigations, urine examinations, chest radiographs (where needed) are done.

The assessment of abdominal wall hernias has long been a clinical skill that only occasionally required the supplementary radiological assistance of herniography. In almost all cases the correct diagnosis can be reached on the basis of the patients history symptoms and clinical examination

INDICATIONS FOR INVESTIGATIONS:

1. Patients who are obese
2. patients with palpable masses within deep layers of the abdomen
3. Patients with pain and complaints within the abdominal wall but without causative clinical findings.

But in some patients certain investigations are of benefit like:

1. Ultrasound of the abdomen
2. Herniography
3. Computerised tomography
4. Magnetic resonance imaging

Ultrasound abdomen, Herniography Computed Tomography, Magnetic Resonance Imaging are all established and accepted investigations for imaging hernias in cases of diagnostic uncertainty.

I. SONOGRAPHY

Sonography is indicated primarily in patients with palpable masses within deep layers of the abdominal wall, especially in obsess patients and in patients with pain located within the abdominal wall without any causative findings. In patients with hernia, a measurement of the defect can be done.

Sonographic Criteria for Hernias

The sonographic image of a hernia is a fascial gap with protruding hernial contents. The hernial contents should be reducible into the peritoneal cavity. The sac should generally reveal an increase in size or a change of location when the patients cough or presses. In minor hernias, only a small fascial gap or a vaulting is found during dynamic examination. The hernial contents can be identified. Intestinal structures are characterized by peristaltic movements and air bubbles, while the omentum appears as a stationary, highly reflective, space occupying structure. Sonography serves to inform potential areas of hernia formation by depicting thin areas of abdominal wall.

Incisional Hernia

Sonography shows the typical hernial pattern with a fascial gap and protruding hernial sac. After mesh repair for hernia, a recurrence can occur at the edge of the mesh which can be seen sonographically.

Most hernias noted are incidental findings. The accurate demonstration of size, site, and contents of sac is useful in assessing the potential risk of strangulation or the likely success of hernia repair. Imaging is also useful when early dehiscence of the muscle layer in an anterior abdominal wall closure occurs without disruption of the overlying skin.

In comparison with CT or herniography, the ultrasonography is time as well as cost saving and not burdened with risks such as contrast allergy.

Epigastric Hernia

The hernia is visualized by a characteristic midline fascial defect.

	Predictive Value			
	Sensitive	Specificity	Positive test	Negative test
Epigastric Hernia	100%	100%	100%	100%

Divarication of Rectus Abdominis

Can be clearly visualized by sonography and the resulting herniation in abdominal wall.

Spigelian Hernia

A defect in the outline and an anterior bulging of the rectus margin confirm the hernia.

II. COMPUTED TOMOGRAPHY

Computed tomography is an excellent method of evaluating the abdominal wall and its relations to the abdominal viscerae. Lesions can be easily identified, owing to their different density.

There are several reports in the literature concerning the primary diagnosis of spigelian hernia by CT which can elegantly demonstrate.

CT allows exact evaluation of the volume and content of giant hernias. CT is also used to differentiate postoperative findings such as haematoma, abscess, or recurrence of hernia after laparoscopic repair of ventral hernia.

The sensitivity of CT is reported as 83% with a specificity of between 67 and 83%. False negative results may be attributed to reduction of the hernia with the patient in supine position.

III. MAGNETIC RESONANCE IMAGING

Compared to CT, MRI offers the advantage of direct multiplane imaging without ionizing radiation and the use of contrast agents. A relative merit of MRI is the excellent demonstration of abdominal wall layers.

In conclusion, CT and MRI are not the first method of choice in the diagnosis of abdominal wall hernias. However these methods are useful in distinguishing hernias from benign, malignant or inflammatory lesions of the abdominal wall and their correlation to the intra-abdominal cavity, if clinical examination and sonography fails. In cases of abdominal wall relaxation, MRI allows direct comparison of the affected and the unaffected sides. The disadvantages include higher cost, limited availability and potential allergic reaction to contrast medium.

MRI clearly visualizes diastasis of rectus abdominis muscle and resulting herniation in abdominal wall.

IV. **HERNIOGRAPHY**

Herniography has a low complication rate, relating mainly to accidental colonic puncture, of less than 1%, contrast allergy, and irradiation to pelvic region. It is invasive and is likely to be replaced by cross sectional imaging.

With the techniques now available, there is no indication for herniography, even if the complication rate is low.

OPERATIVE MANAGEMENT

PRE-OPERATIVE PREPARATION

1. Optimal skin hygiene.
2. Weight reduction for obese patient.
3. To stop smoking.
4. The repair of a large postoperative ventral hernia should be delayed for atleast one year after the operation that caused the hernia or after a previous attempt at repair.
5. Wait for atleast one year after all infection and sinuses have healed.
6. Associated cardiovascular, respiratory, renal conditions, Diabetes Mellitus, hypertension and other general illness must be diagnosed, assessed, and treated. The operation is usually elective and must be delayed until the patient is in an optimal state.
7. Perioperative antibiotics are used more liberally.
8. The patient is investigated for coexisting abdominal pathology so that it can be dealt with at the same operation.

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12. Perioperative antibiotics are used more liberally.
13. The patient is investigated for coexisting abdominal pathology so that it can be dealt with at the same operation.

INDICATIONS

1. Pain and discomfort.
2. Large hernias with small openings.
3. A history of recurrent attacks of sub-acute obstruction, incarceration, irreducibility and strangulation,
4. For cosmetic reasons for a large and unsightly hernia.

GENERAL PRINCIPLES IN REPAIR OF VENTRAL HERNIAS

1. Spinal and epidural anaesthesia gives excellent relaxation with minimal respiratory depression.
2. Hemostasis should be as careful and as effective as possible.
3. Permanent suture material should be used for the repair.
4. The choice of incision is governed by the orientation of the defect.
5. Healthy fascia must be isolated.
6. Closure of the sac is done in one layer, incorporating both fascia and peritoneum after opening the sac, freeing all adhesions, reducing the viscera and exploring the abdomen.
7. Drain should be used wherever needed.

The main danger in all forms of hernia is that of strangulation. Hernia left alone has got the tendency to increase in size and land up in complication one day or other. So there is hardly any reason for not operating on all hernias as soon as they are diagnosed.

This is especially so when one considers the morbidity and mortality and the high recurrence rate when operation is undertaken for a neglected strangulated hernia. After admission special care is taken to note down any factors responsible for straining and are corrected by appropriate measures. Attention is drawn towards the skin between the large pendulous hernia and abdominal wall skin. Any intertrigo or eczema is corrected by keeping the part dry and antifungal treatment.

EPIGASTRIC HERNIA:-

Simple Closure:-

It is employed for small hernias. The herniated fat is exposed through small transverse incision and is excised. The fascial opening in linea alba and some centimeters of fascia around it are cleared of fat. If the small sac is empty it is pushed into peritoneal cavity. If the sac has irreducible contents, the sac is opened and contents are pushed into abdominal cavity and sac closed. The opening in the linea alba is closed transversely with continuous or interrupted sutures of fine mono-filament polypropylene or polyamide, by taking generous bites of the edges.

Reconstructions of Linea Alba:-

When several such epigastric hernia occurs nearby it probably reflects a generalized weakness of the midline fascia, complete linea alba from sternum to umbilicus is repaired.

a) Modified Shoelace Technique.:-

The basic step is to reconstruct a strong new midline anchor by suturing together a strip of medial edge of each rectus sheath. Then the lateral cut edges of anterior rectus sheath are united taking bite in the new linea alba. Thus whenever the lateral abdominal muscles contract they bring the anterior abdominal wall inwards (physiological) rather than separating the suture line.

b) Vertical Mass Closure Technique:-

Repair is done by taking bites that include not only linea alba but also part of anterior and posterior rectus sheath.

c) Vertical Overlap Technique:-

Vertical incision is made along the anterior rectus sheath to create a flap. The flaps are double breasted and repaired.

Repair of Large Epigastric Hernias:-

The larger hernial sac is opened, contents are replaced into abdomen, and sac is excised. Upper and lower edges of the fascial openings are approximated by continuous mass closure. The repair is reinforced by onlay nylon darn. Still larger hernias are treated by use of synthetic mesh.

Koontz's Operation:-

The sac is excised and peritoneal cavity is closed. The relaxing incisions are carried out over the anterior rectus sheath. Now the fascial margins are approximated in the center. The whole area is reinforced with tantalum gauze or marlex mesh including the relaxing incision area.

Ker's Operation:-

The sac is excised and peritoneum closed. Longitudinal incision is made in the posterior rectus sheath on both sides. The sheath flap is dissected free of rectus muscle. The gap in the posterior rectus sheath is reinforced with mesh. The rectus muscles are approximated. The flaps are double breasted anterior to the rectus muscles.

ADULT UMBILICAL HERNIA: -

Principles of surgical correction are excision of the sac; vertical or transverse double breasting of rectus sheath. Mayo's operation: - A curved skin incision is made around the inferior aspect of hernia in a skin crease. Skin flap and umbilical cicatrix are raised by incising subcutaneous fat. Fascial edge of the hernial opening and the neck of the sac are exposed. A wide area of anterior rectus sheath around the opening is cleared of fat. The neck of the sac is circumcised along the edge of the hernial opening. Contents of hernia are freed and returned to peritoneal cavity. Peritoneal opening is closed transversely. The fascial defect is closed by overlapping the upper flap over the lower flap by two rows of interrupted sutures. Umbilicus may be excised. Skin closed with a drain in situ.

INCISIONAL HERNIA

The main steps of surgery are as follows. Elliptical skin incision is made around the previous scar. Incision is extended above and below previous incision so that the healthy area can be identified and used to enter into peritoneal cavity without blindly disturbing the sac with adherent contents.

After freeing the adhesions and dissecting out the sac, the sac is excised. Linea alba/Rectus sheath is strengthened. Layers of abdominal wall are closed.

There are various methods of repair of Incisional hernia.

I. Repair of Abdominal Wall:-

1. Anatomical layer by layer reconstruction.
2. Layered reconstruction - Cattell's operation.

II. Overlap Methods:-

1. Transverse overlap – Mayo's.
2. Vertical overlap - Rutherford Morris.
3. Lanenskiold's Ribbon overlap procedure.
4. Chaimoff - Dintsman fascial flap method.
5. Muscle flap procedure.
6. Raviteh's operation.

III. Latice or Darn Repair:-

1. Burton's fingered fascia lata graft repair.
2. Nylon Darn - Huntor.
3. Maingot's Floss silk darn and Keel operation.

4. Stainless steel darning - Abel.
5. Skin /Duramater /fascia / tendon darning.
6. Shoelace Darn Repair.

IV. Extensive Tissue rearrangement technique:-

Nuttell's operation.

V. Repair by Implants:-

Various materials were used for this technique

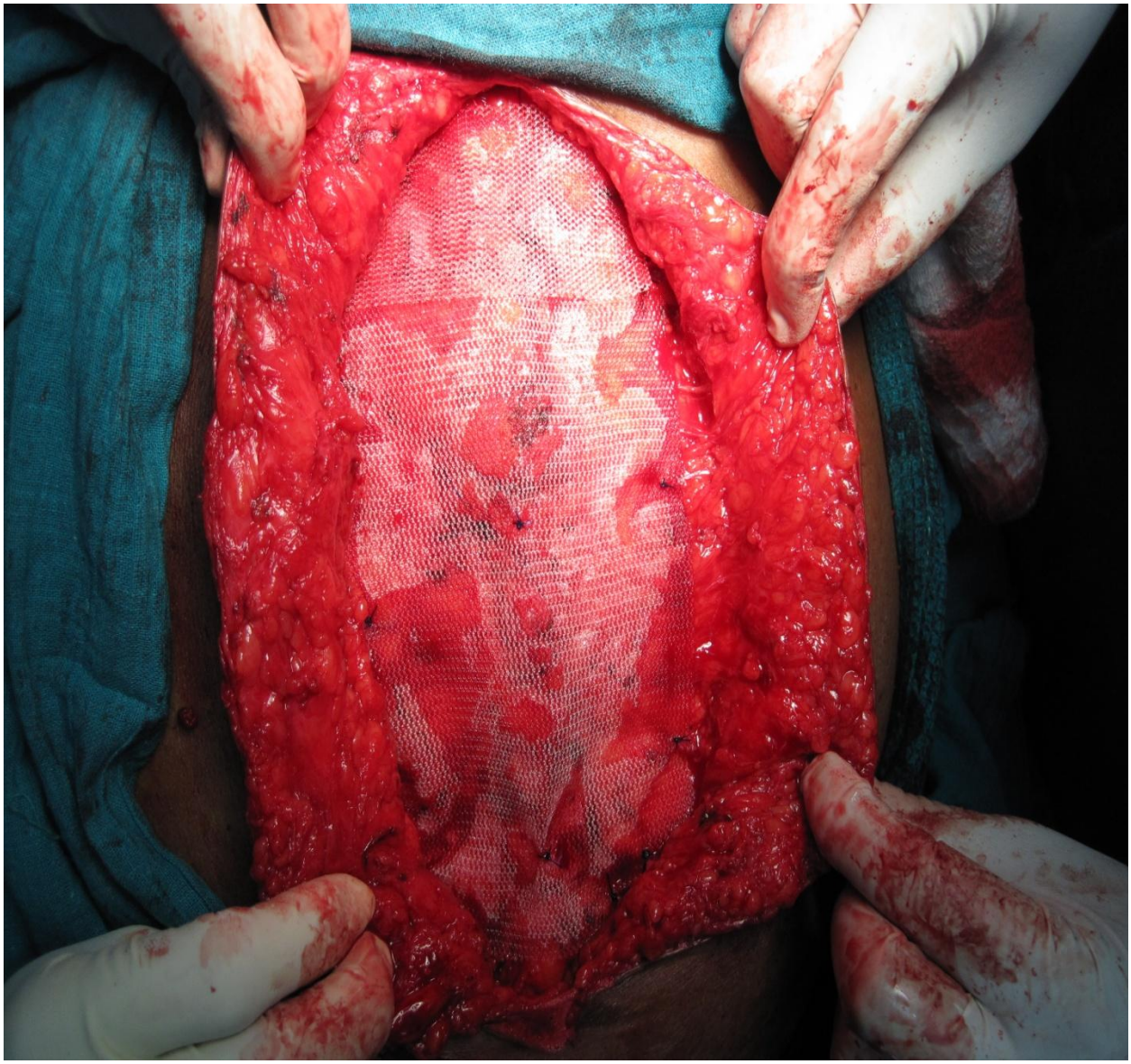
1. Stainless steel plates, gauze.
2. Tantalum gauze.
3. Silver filigree.
4. Pliable plastic sheet.
5. Whole thickness skin graft.
6. Poly vinyl alcohol sponge.
7. Nylon Tricot.
8. Polypropylene mesh
9. Polytetra fluoroethylene (PTFE).

Rodney maingot advises 3 basic methods for repair of these hernias

1. Resuture
2. Shoelace darn repair
3. Synthetic non-absorbable mesh closure.

FIGURE NO:13 INCISIONAL HERNIA PREVIOUS 2 LSCS PATIENT

FIGURE NO: 14 INCISIONAL HERNIA - MESH REPAIR



PROCEDURES:

I. REPAIR OF ABDOMINAL WALL:

1. Anatomical Layer by Layer Reconstruction:-

It is ideal for small hernias. The sac is excised and closed with chromic catgut. Anterior and posterior rectus sheaths are dissected out and closed with non-absorbable suture materials as one would do at the end of a laparotomy.

2. Cattell's Operation:-

Hernial sac is opened. Neck of the sac sutured in first layer, excess sac is cut off. Cut edge of the sac is sutured in second layer. Posterior rectus sheath is sutured in third layer. Muscles are sutured in fourth layer. Anterior rectus sheath is sutured in fifth layer.

II. OVERLAP METHODS:

Mayo's operation:- After excising and suturing the sac, rectus sheaths are dissected free of fat and overlapped transversely over each other and sutured in place.

Langenskiold's Operation:-

The sac is opened by several parallel incisions so as to create a number of 2 cm wide strips which are detached at one end "alternating between right and left. These strips are brought through same number of slots about 2 cm, from the

operative margin of the hernial orifice and tightened. These strips are either folded back and fastened with sutures or tied together in pairs. Over which skin is closed.

Chaimoff - Dintsman's Fascial Flap methods:- A vertical cut is made laterally over the anterior rectus sheath and the fascia is raised and separated from the muscle. The raised flap is overlapped and sewed together.

Muscle Flap Procedures:- In upper abdominal hernias pectoralis major pedicle flaps were used by Kenneth Me Kenzie in lower abdominal hernias tensor fascia femoris flap were used by O.H. Wangen Sten and Me Kenzie.

Raviteh's Operation:- Used for larger suprapubic hernias. Anterior rectus sheath is dissected and overlapped and sutured. Inferior border of flaps are sutured to connective tissue over symphysis pubis.

III. LATICE OR DARN REPAIR:

Burton's Fingered Fasica lata Graft:- The hernial sac is dissected and sutured. Fascia lata graft larger than the size of the gap is taken and the graft is held over the ring.

Several parallel lateral incisions of 2cm width are made on either side of the excess part of the graft. Graft is now placed under rectus sheath. Same numbers of slots are made about 2cms from the margin of hernial orifice on either side. The fascia lata strips are drawn through the slots. The strips are folded back, tightened, twisted in pairs with the opposite strips and held in place with sutures.

Maingot's Keel Operation:- Used for larger hernias. The sac is dissected but not opened. Fibrofatty tissues at the margins of the ring are removed to expose healthy aponeurosis all around the sac. The loose peritoneal sac is inverted into abdomen by layers of sutures. The sac now resembles a keel of a ship dipping into peritoneal cavity. When strong aponeurosis margin of the hernia is reached they are sutured together with series of closely applied mattress sutures or continuous right angled Cushing's stitch

Shoelace Darn Repair:- Skin and fat are dissected out of hernia, as well as rectus sheath on both sides. The anterior rectus sheath should be exposed sufficiently to allow for splitting off of the medial ribbon. An incision is made in each anterior rectus sheath about 1cm or more from its medial edge. This incision is extended up & down, through entire length of the hernial opening and for about 2cm beyond, keeping the ends of the incisions away from and parallel to the midline. The two strips are sewn together from above downwards

by a continuous over and over suture of mono filament nylon. This creates a new linea alba. The sac remains unopened throughout the operation. The gap between the anterior rectus sheath is closed by the second suture with 6 m length of heavy monofilament nylon each starting at one end of the incision in the rectus sheath, and meeting in the middle, of the line of repair, where they are tied to one another. Skin closes over this with a drain

IV. EXTENSIVE TISSUE REARRANGEMENT TECHNIQUE:

Nuttell's Operation:-It is a type of repair in which extensive mobilization and rearrangement of abdominal muscles were carried out. It was used for sub umbilical massive incisional hernias.

The sac is dissected, excised and sutured. Each rectus muscle is then detached from the origin from pubic symphysis. The right rectus muscle is drawn towards the left pubis and sutured to the ligaments and fibrous tissue there. Then the left muscle is sutured to the right side. Loosely applied interrupted sutures are inserted along the edge of muscles. Margins of rectus sheath are brought to mid line and sutured.

v. IMPLANTS:

Repair of Incisional hernia is one of the few instances in surgery in which implants of foreign materials were used to bridge the gaps, before the use of natural tissue. The modern era of prosthetic hernia repair began in 1958 when Usher reported his experience with polypropylene mesh. Later polyamide mesh and recently PTFE mesh were introduced. With the development of modern synthetic non-absorbable suture materials, three basic methods have emerged for repair. Resuture, shoelace darn technique and synthetic non-absorbable mesh closure. Resuture is used for small hernias.

Shoelace darning is used for wider defects. For real giant hernias prosthetic mesh repair is ideal. Of the materials available today knitted polypropylene mesh is most popular, followed by PTFE mesh. Fibro vascular tissue grows through the pores and invades the mesh which is eventually incorporated into body in a strong and pliable collagen sheet. When placed on the inner surface of peritoneum it soon gets covered with peritoneum with minimal adherence between bowel and mesh.

TYPES OF PROSTHETIC MESH REPAIR:

Many variations and combinations of mesh repair have been described. They are as follows,

- Underlay Graft:- A mesh may be sutured in place deep to peritoneum.
- Inlay Graft:- Mesh is placed between peritoneum and abdominal wall and sutured to edge of the defect.
- Overlay/onlay Graft:- Larger mesh is placed over the defect and sutured.
- Both Inlay and Overlay:- are used in combination,
- Large Underlay Graft:- A large graft can be placed subperitonealy extending almost over the anterior abdominal wall and sutured in place.
- Large Overlay Graft:- Graft is kept above the defect and surrounding muscles and sutured in place.

CHOICE OF MATERIAL

The ideal mesh is one that is cheap and universally available, is easily cut to the required shape, is flexible, slightly elastic and pleasant to handle. It should be practically indestructible and capable of being rapidly fixed and incorporated by human tissues. It must be inert and elicit little tissue reaction. It must be sterilisable and non-carcinogenic.

Polypropylene mesh meets the requirements of the ideal prosthesis and is today the most commonly used material for repair of all types of hernia.

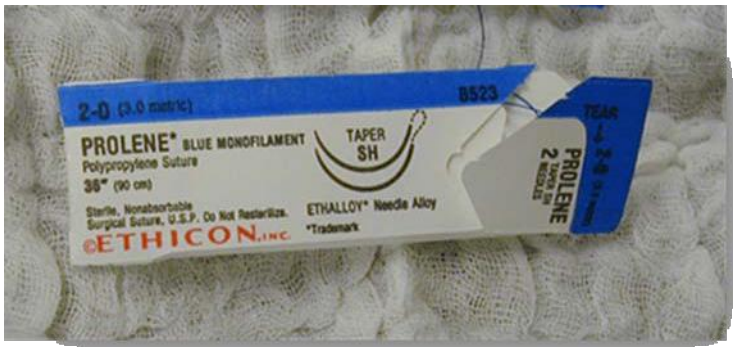
a)POLYPROPYLENE MESH (MARLEX,PROLENE)

This is currently most widely used prosthetic material in hernial repair. It is formed of knitted monofilament plastic fibers and has minimal elasticity or stretch capacity. Prolene elicits an intense desmoplastic reaction in tissue, accompanied initially by serous exudation and resulting eventually in the formation of a sheet of scar that uses the mesh as a scafford for its formation. The mesh thus becomes densely incorporated in the scar. In 1963, Usher introduced knitted monofilament polypropylene mesh into clinical practice. The disadvantages are visceral adhesions, erosion into the bowel/skin causing enterocutaneous fistula/ sinus formation, erosion of mesh into urinary bladder.

Sterilization: gamma radiation; after removal from its package, the mesh can be resterilised by autoclaving for three times only.

FIGURE NO 15 : NON-ABSORBABLE SUTURE MATERIAL

POLYPROPYLENE MESH



PTFE (Teflon, Gore-Tex)

It is supplied as a felted sheet in which fibers randomly interlace. It is used for vascular prosthesis. It is strong, pliable, soft, smooth and slippery to touch, biologically inert and causes little tissue reaction. It is costly.

c) POLYESTER MESH (DACRON) MERSILENE

It is multifilament knitted mesh. It is cheap, freely available, light, and supple, has a pleasant, soft feel and is strong and elastic. It excites greater tissue inflammatory reaction than prolene. It tears easily.

d) FASCIA LATA

It is harvested from lateral aspect of the thigh. It is strong and flexible although minimally elastic. The use has been abandoned.

The other prosthetic meshes tried are polyglycolic mesh,

Polyglactic mesh, metal meshes and gelatin film.

INDICATIONS FOR MESH REPAIR

The indications are:

Repair of recurrent incisional hernias: successful repair of recurrent hernias in patients, whose musculature is of poor quality and weak and flabby, fascial coverings are thin and weak, requires prosthestic material.

In primary repair of massive hernia in which tissues are deficient and repair without tension cannot be accomplished readily by conventional techniques of direct suturing. The employment of a bridging prosthesis in a massive incisional hernia will enable the surgeon to avoid excessive tension in wound closure and the hazards of increased intra-abdominal pressure.

When continued presence of forces tending to disrupt in the future are reasonably predicable. There are certain conditions which present a relatively high risk of recurrence unless prosthetic materials are used. They are chronic cough, increased intra-abdominal pressure from obesity and massive incisional hernias.

Losses of essential fascial segments by severe trauma, radical resection of malignant tumours involving the abdominal wall may sometimes require prosthetic materials for effective closure.

Hesselink et al. have shown that any ventral/incisional hernia greater than 4 cm and recurrent hernial have a high rate of recurrences if not repaired with mesh.

Both large underlay and large overlay graft can be used together for very weak abdominal wall.

Reinforcing strips - Onlay and Underlay strips can be used.

Wrap Around - Reinforcement of wound edges with mesh.

Two sheets of mesh sutured to abdominal wall then sutured to each other to draw together to the edge of the wound.

Onlay Technique

In this technique usually a polypropylene mesh is sutured to the anterior rectus sheath after the fascial defect has been closed primarily.

Procedure

After managing hernial sac and its contents as described in Mayo's repair, aponeurosis is approximated using polypropylene suture and prosthetic mesh is placed over the aponeurosis and fixed with polypropylene suture material. Suction drain placed subcutaneous tissue and skin sutured.

The potential advantage of this repair keeps the mesh separated from the abdominal contents by full abdominal muscle fascial wall thickness.

Disadvantages of this repair include, a repair under tension, large subcutaneous dissection that allows for seroma formation, and mesh infection

when the surgical wound becomes infected. No studies available to accurately state recurrence rates with this repair.

Inlay Mesh Repair

After reducing the sac and its contents, peritoneum is closed using chromic catgut and mesh fixed with polypropylene suture material. Rectus sheath is closed over the mesh. Suction drain kept and wound closed in layers.

The potential advantage of this repair keeps the mesh separated from the abdominal contents by full abdominal muscle fascial wall thickness.

Disadvantages of this repair include, a repair under tension, large subcutaneous dissection that allows for seroma formation, and mesh infection when the surgical wound becomes infected. No studies available to accurately state recurrence rates with this repair.

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Intraperitoneal Underlay Mesh Repair

Since the development of bilayer prosthesis in the late 1990, intraperitoneal placement of mesh has become more commonplace. Advocates of intraperitoneal mesh placement state that this technique allows for the largest underlay of mesh on the fascia or abdominal wall, which should reduce recurrence because a larger amount of tissue in growth can occur, reducing apossible mesh fascia sepration. The open technique involves opening the hernial sac, dissecting bowel away from the abdominal wall, and placing the

mesh intraperitoneally with the non-adhesive surface of mesh facing against the abdominal contents and the tissue in growth side of the mesh against the muscular or fascial side of the abdominal wall. Fixation of the mesh material is currently being debated among surgeons. Some fix the mesh only to the fascial edge, other fix the mesh to the posterior abdominal wall laterally with partial thickness sutures, and yet others prefers full-thickness muscular or fascial abdominal wall fixation at least 5cm lateral to the hernia defect circumferentially.

FIGURE NO 16: INCISIONAL HERNIA SAC

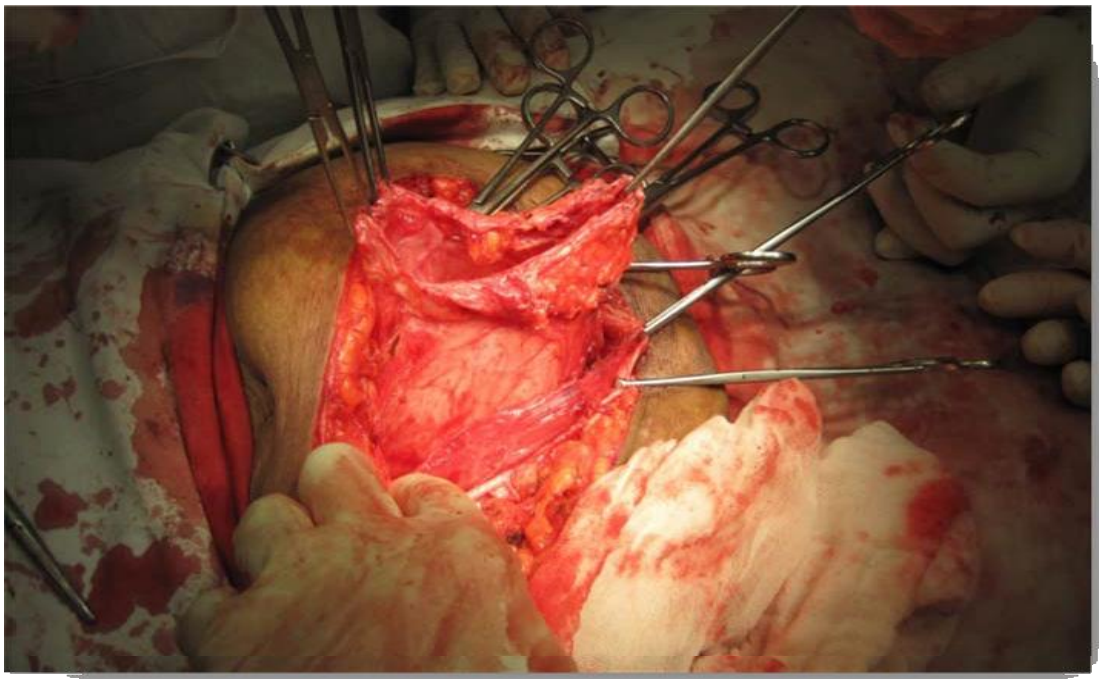


FIGURE NO 17: ANATOMICAL REPAIR OF HERNIA SAC

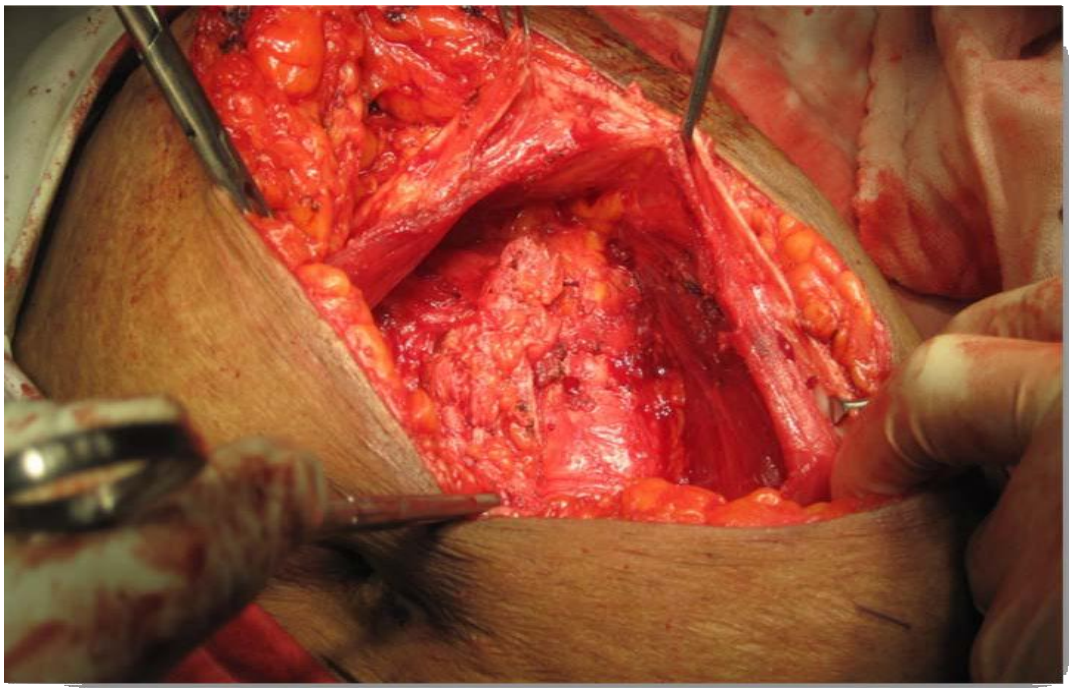
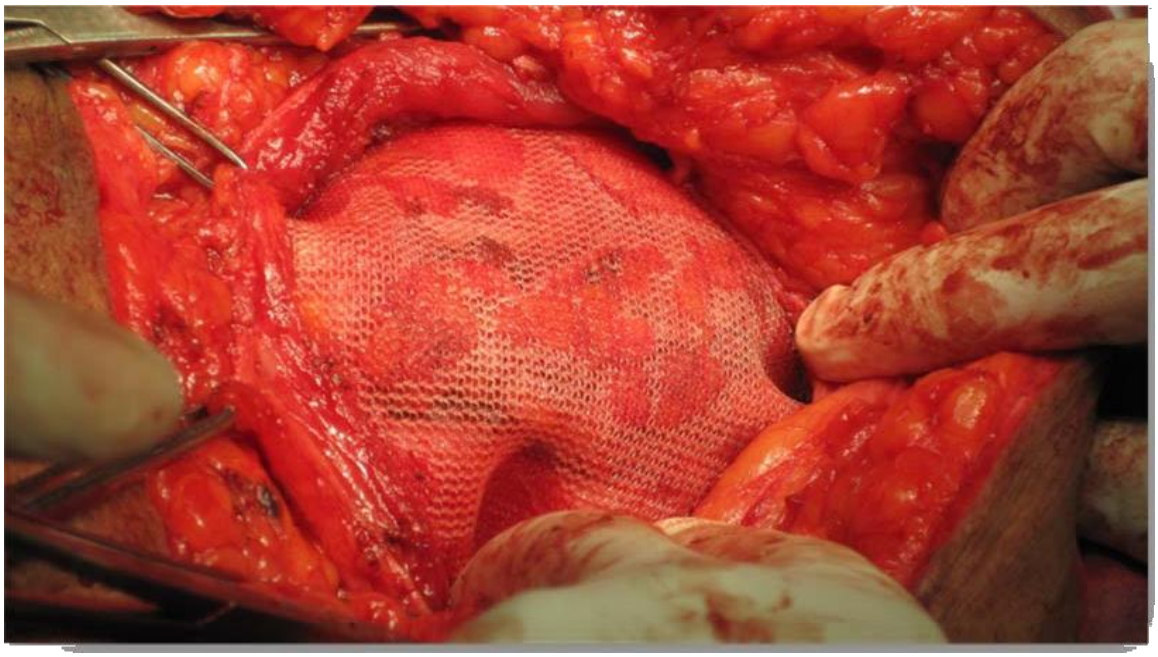


FIGURE NO 18: RIVES-STOPPA MESH REPAIR



RIVES-STOPPA TECHNIQUE (RETRORECTUS MESH REPAIR)

Another promising technique is the Rives-stoppa procedure developed for the repair of incisional hernias. Prosthetic material is used to close the defect in a so called sublay technique. The prosthesis is placed between the rectus abdominis muscle and posterior sheath. Above the umbilicus, dissection is performed above the posterior rectus fascia and underneath the rectus muscle. Below the umbilicus, the lack of a posterior rectus fascia necessitates dissection in the preperitoneal space. A large piece of polypropylene mesh is placed in the space created, and fixed to muscle layer above with full or partial thickness suture. The recurrence rate with this repair have been stated to be less than 10%.

LAPAROSCOPIC REPAIR OF INCISIONAL HERNIA

The laparoscopic approach involves entering the abdomen away from the hernia defect, lysing adhesion to remove structures from the hernial sac and adjacent abdominal wall. Mesh is inserted through a trocar site and fixed to the abdominal wall with partial thickness tacks or full thickness abdominal muscular or facial wall suture. The latter is more technically challenging but also more closely duplicates the open approach. The laparoscopic approach has been noted to have a significant seroma rate of approximately 10-15%. The recurrence rates have generally been less than 5%. Laparoscopic umbilical

hernia repair with mesh is reasonable alternative to conventional repair for defects that will require mesh. Although this technique can probably not be justified for typical umbilical defects that would otherwise be closed primarily, further studies looking specifically at issues of cost, return to work, and long-term durability may establish the laparoscopic technique as the preferred mesh repair for large ventral hernias.

SPIGELIAN HERNIA

A transverse or oblique skin incision is made over the lump or the fascial defect. A subcutaneous hernia will immediately reveal itself, but more commonly the hernia is interstitial and external oblique muscle must be split along the line of its fibers to demonstrate the sac. Sac is freed from the surrounding tissue down to the neck. The sac is opened and contents reduced back into peritoneal cavity. The sac may be excised or inverted. The defect in fascia of transverses abdominis and the internal oblique muscles is closed with nonabsorbable suture material. The slit in external oblique muscle is repaired.

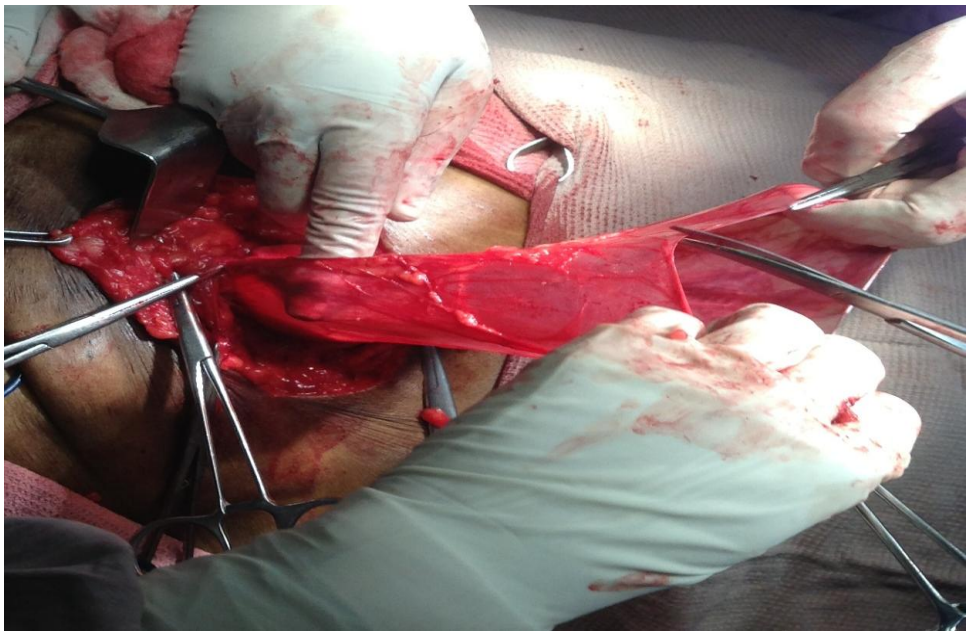
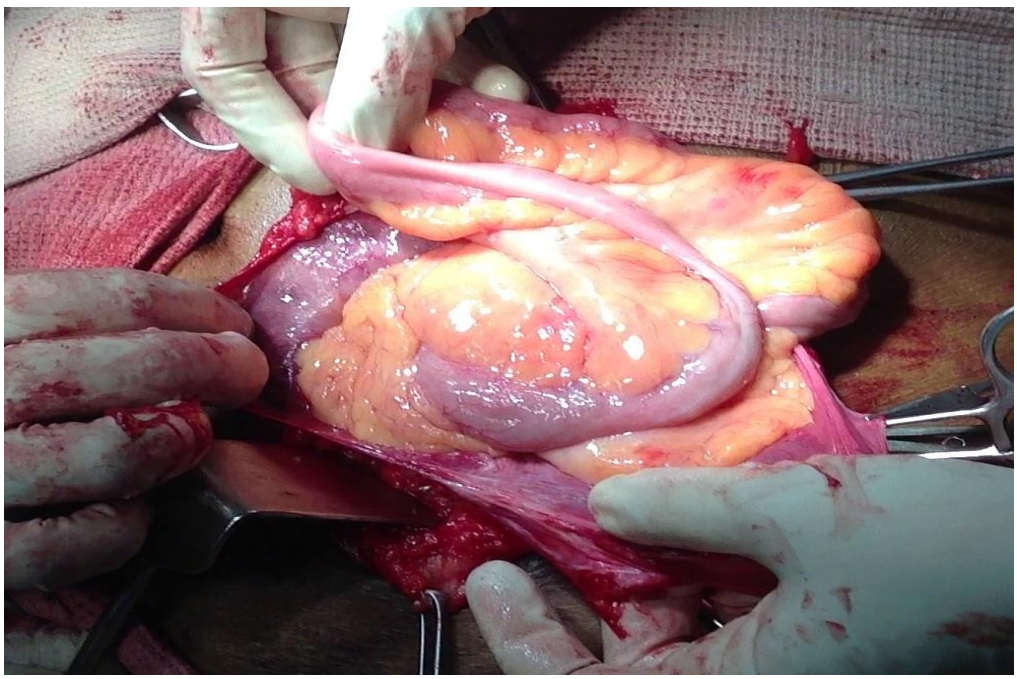


FIGURE NO 19: PICTURES SHOWING HERNIAL SAC AND CONTENTS ILEAL BOWEL WITH MESENTRY IN LEFT SIDED SPIGELIAN HERNIA



COMPLICATIONS AND PROGNOSIS OF VENTRAL HERNIA

Most of the ventral hernias can be cured with surgery, and with good preoperative evaluation and correction of any co-morbid conditions, safe anesthesia, usage of appropriate and preoperative methods and materials excellent postoperative result can be achieved. Complications and recurrences will be negligible if the above methods are followed.

MATERIALS & METHODS

Place of Study : Department of General Surgery,
Govt Royapettah hospital& Govt Kilpauk Medical College Hospital.

Type of Study : Prospective & Observational study

Sample Size : 76

Inclusion criteria:

1. Adult patients above the age of 12 years.
2. Patients presenting with clinically apparent ventral hernia in outpatient Department or in emergency who underwent surgery for the same.

Exclusion criteria:

1. Pediatric cases below the age of 12 years
2. Patient with ventral hernia who were unfit for surgery or refused Surgery.

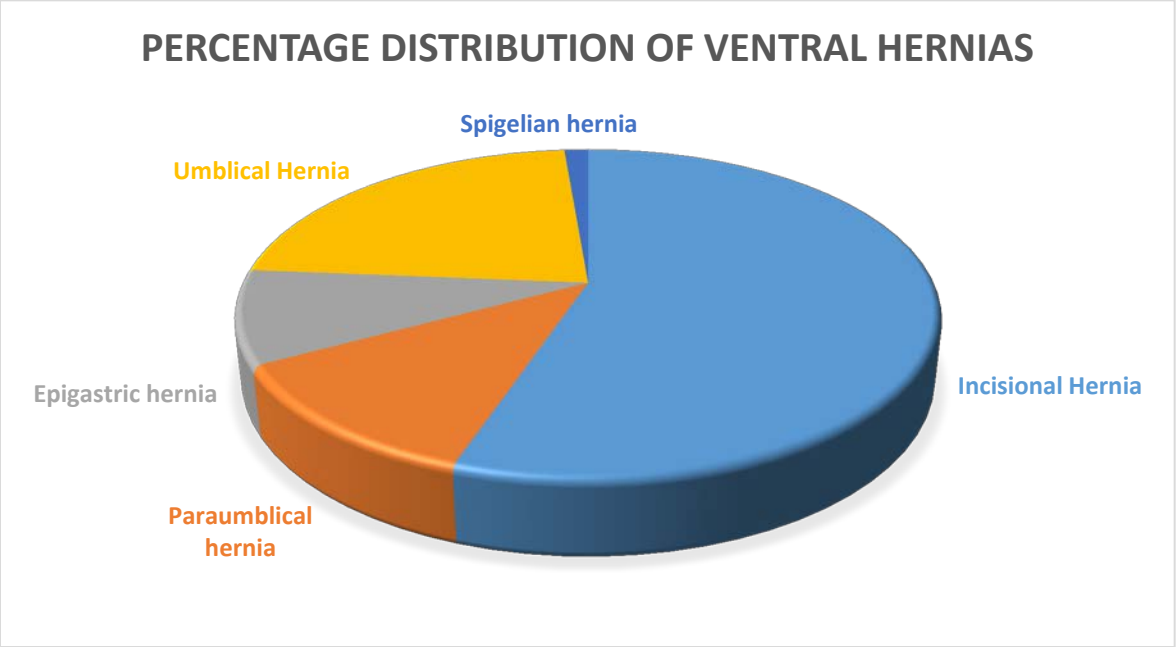
Type of analysis: Clinical data analysis

Data collection:

1. Patients were evaluated with a standardized questionnaire
2. Patients were subjected to thorough physical examination and relevant investigations.
3. Patients were followed up for approximately 2 months after Surgery.

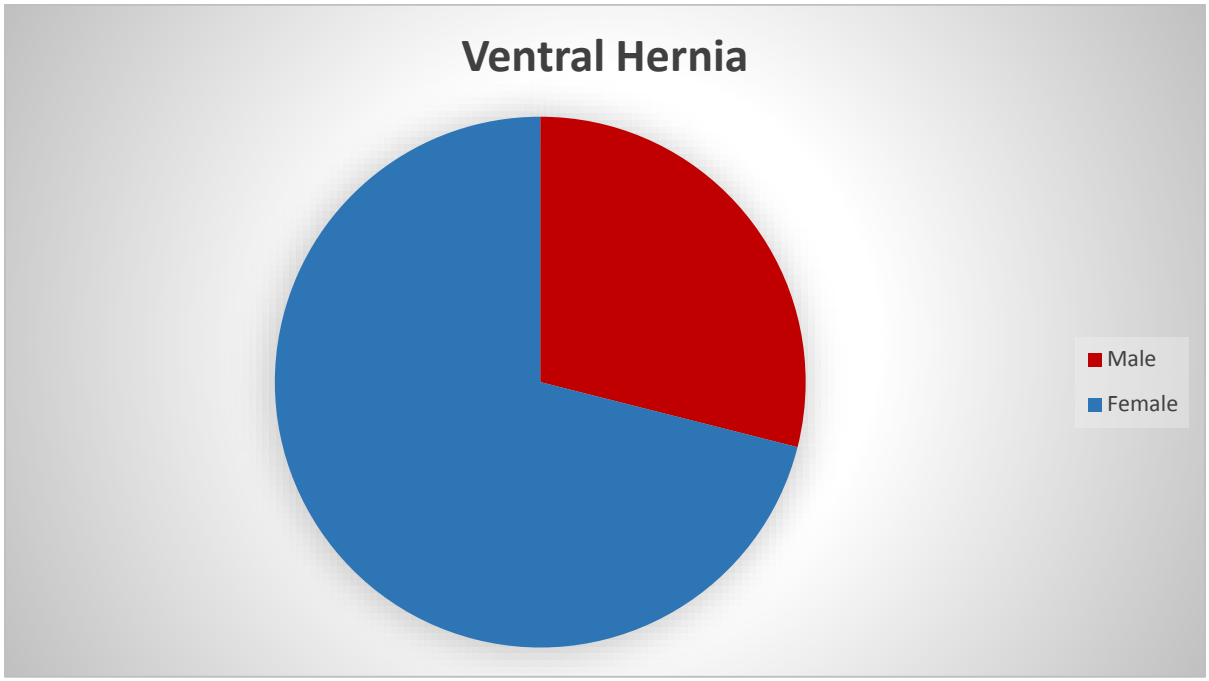
PERCENTAGE OF DIFFERENT TYPES OF

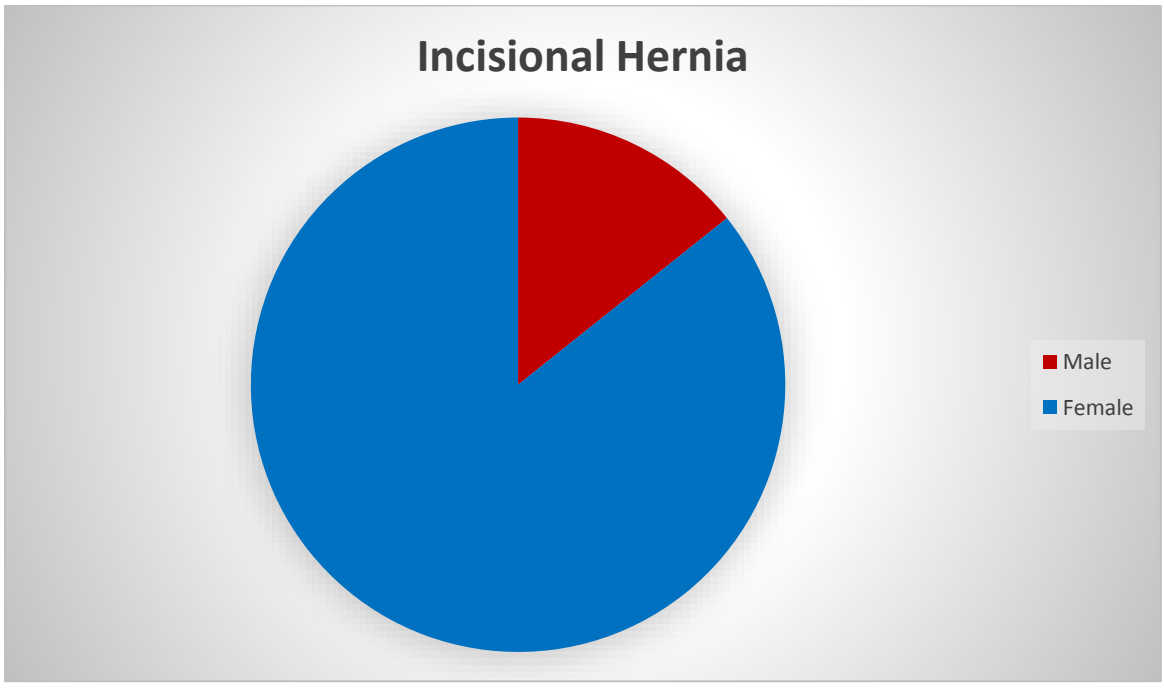
VENTRAL HERNIAS

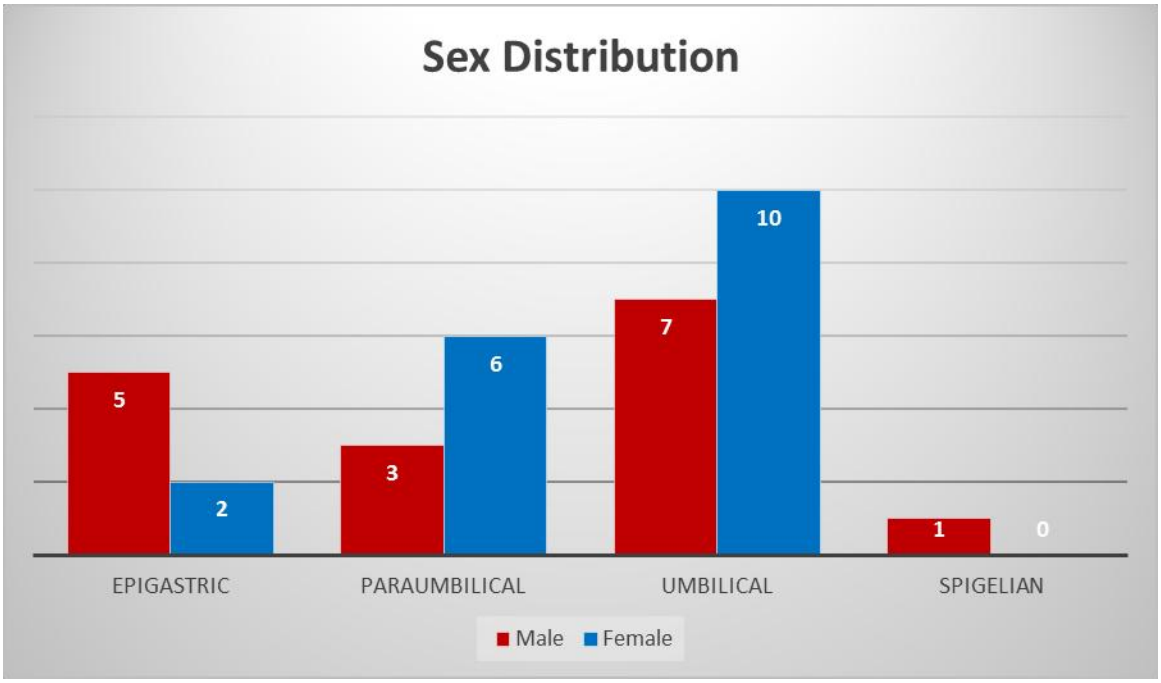


Among the 76 cases of ventral hernias studied 42 (55.26%) were incisional; 7 (9.21%) were epigastric; 17 (22.36%) were umbilical; and 9 (11.84%) were paraumblical and 1(1.31%) was Spigelian hernia. Three patients (one was a c/o cirrhosis with PHT with umbilical hernia and another a c/o coronary artery disease with incisional hernia) and another c/o coronary artery disease with COPD, who were unfit for surgery, were not included in the study.

SEX DISTRIBUTION OF VENTRAL HERNIAS

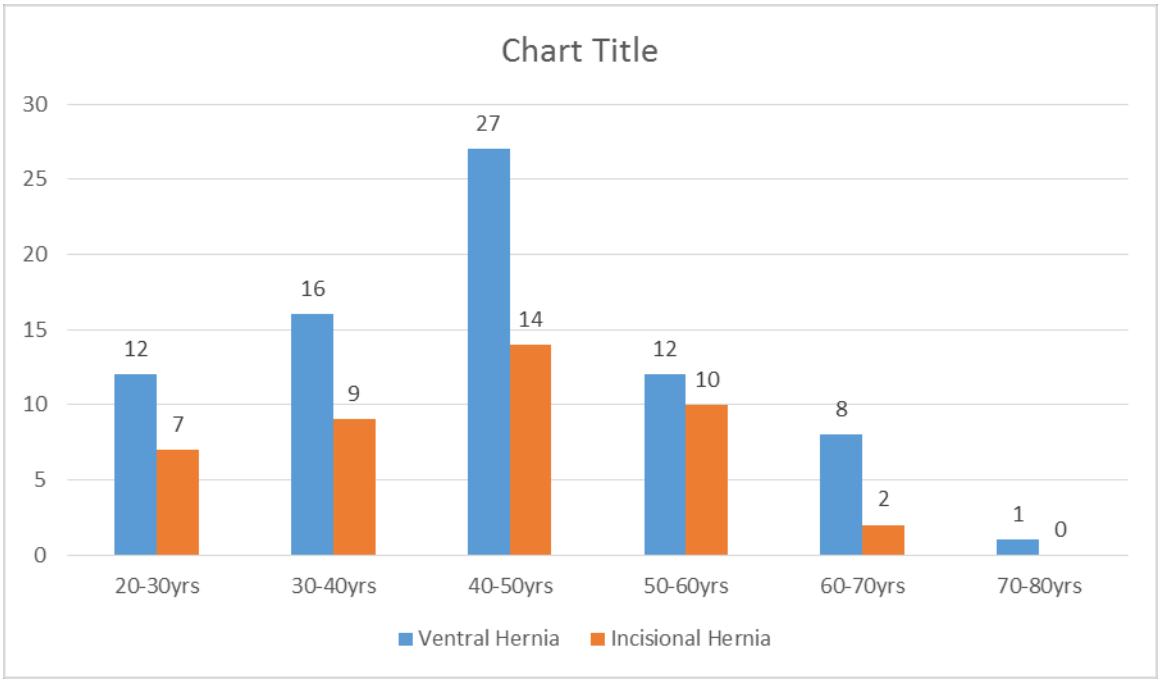






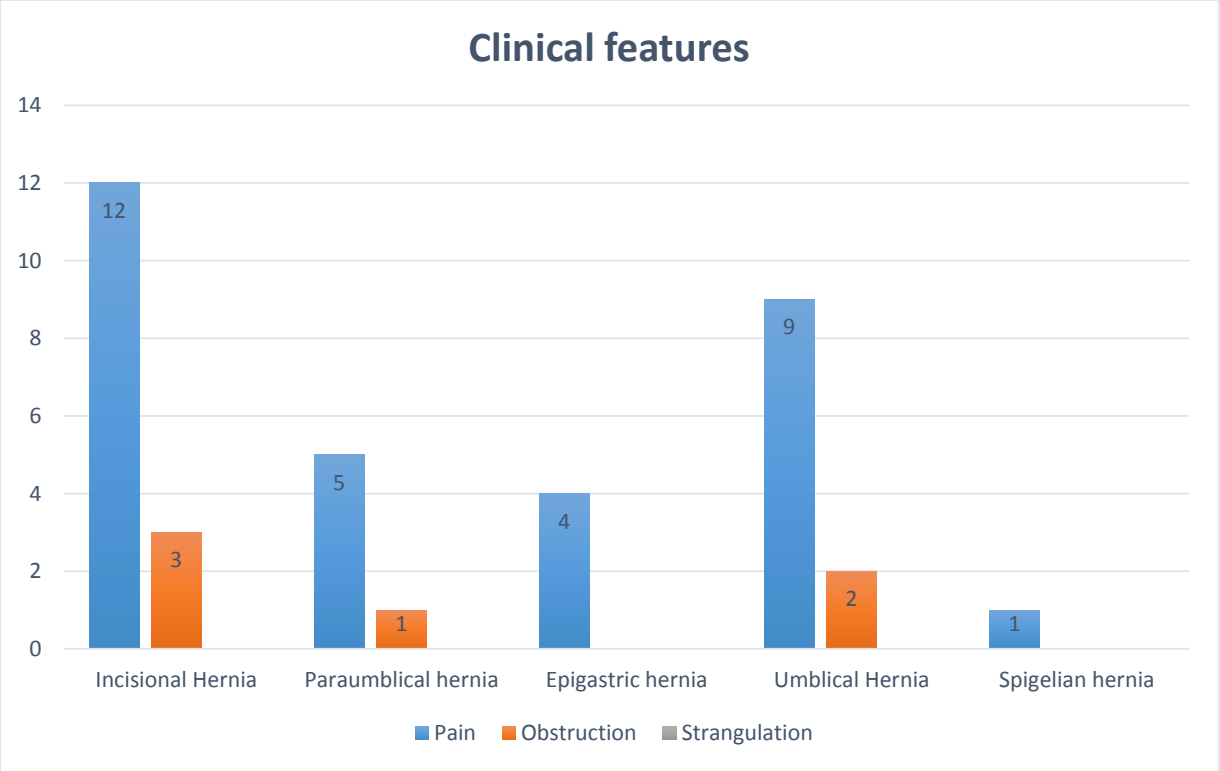
The occurrence of ventral hernia in males was 28.94% and in females it was 71.05%. Among incisional hernia majority of cases were females that is 36 cases (85.71%) out of 42 cases and 6 cases (14.28%) were males. Among epigastric hernia only two patient was females out of 7 cases. Among Para umbilical hernia there were 3 males and 6 females. Out of 17 umbilical hernias 7 were males & 10 female. One case of Spigelian hernia was male patient.

AGE DISTRIBUTION



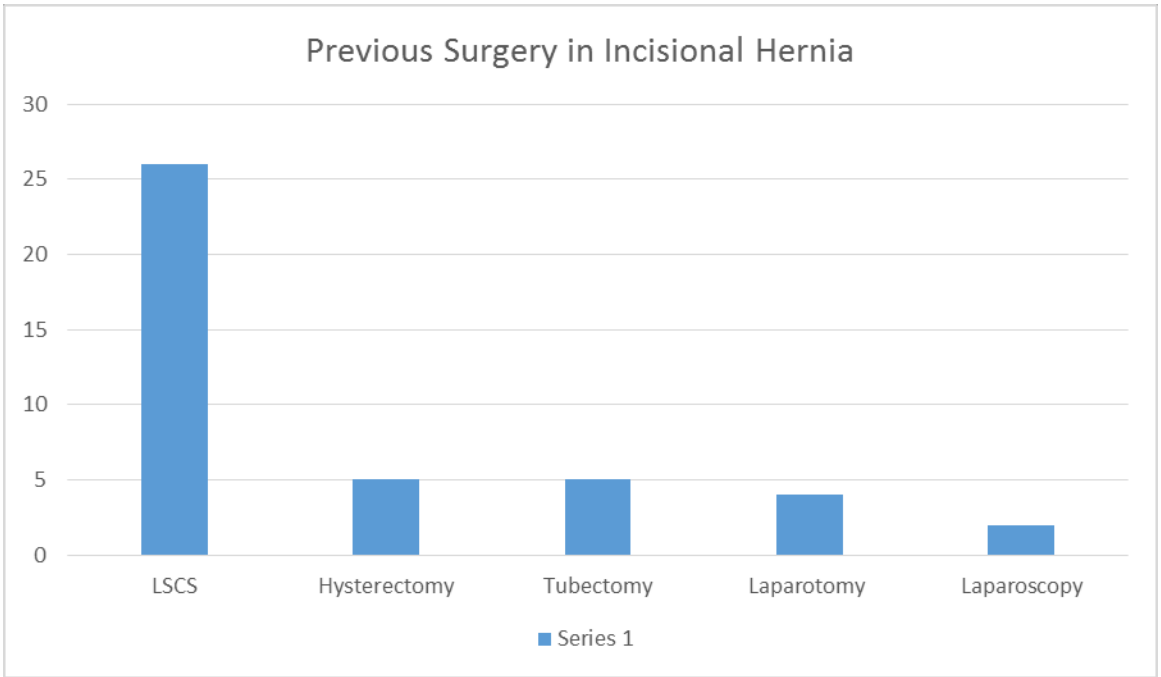
The youngest patient with a ventral hernia was a female patient with an epigastric hernia aged 24 years and oldest was a male patient aged 72years with an umbilical hernia. The highest incidence of **Ventral hernia** was noted in the 4th decade that is 27 cases which amounted to 35.6 % and the lowest incidence was in the 8th decade that is one case which is 1.3%. Among **Incisional hernia** more cases were found in the 3rd decade (9 cases), 4th decade (14 cases), 5th decade (10 cases) which amounted to 78.57 % of all incisional hernia. In **epigastric hernia** 2 cases each were found in 3rd, 4th, 5th decade and 1 case in 6th decade. The incidence in **umbilical hernia** was highest in 5th decade that is 40% of all umbilical hernias.

CLINICAL FEATURES



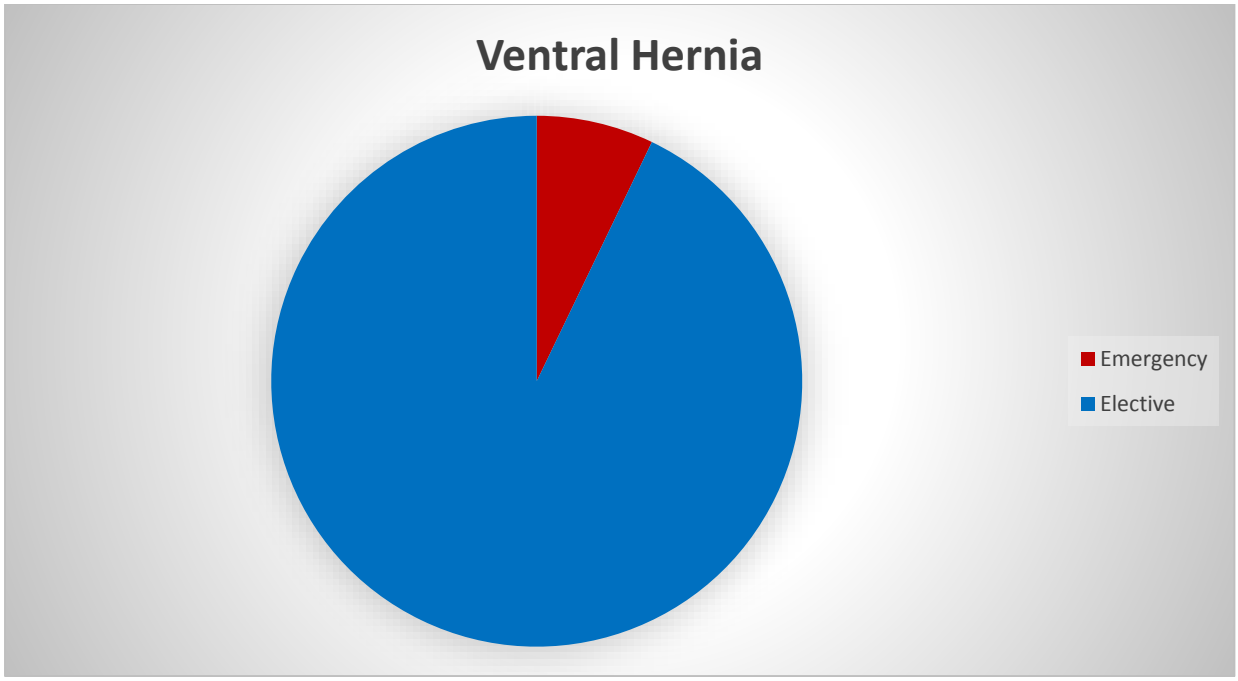
All cases of ventral hernias presented with a swelling (100%). 30 cases presented with pain (39.47 %), 6 cases presented with features of obstruction (7.9 %). No case of incisional hernia presented with strangulation. 30 cases of ventral hernias were obese (cases) (39.47%), 3 cases had chronic cough (3.94%), secondary to chronic obstructive pulmonary disease. 3 cases were multiparous (5.35%). 13 cases had anemia (17.10%) and 3 cases had hypothyroidism (3.94%).

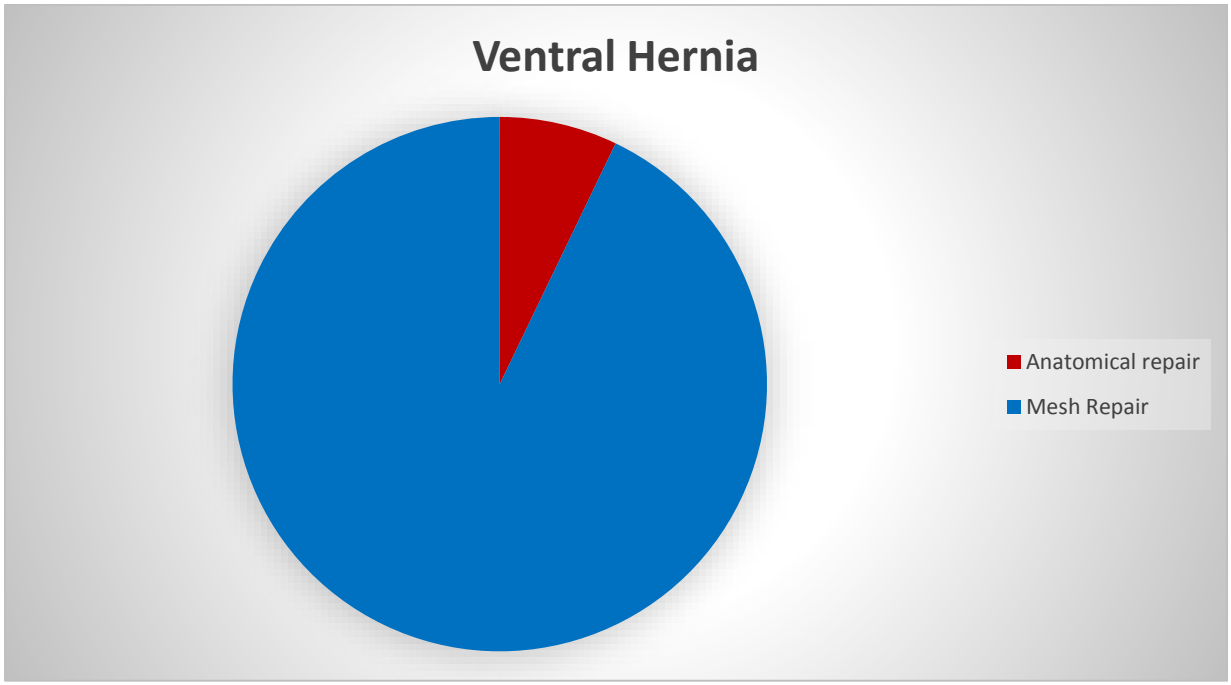
PREVIOUS SURGERY IN INCISIONAL HERNIA



Out of 42 incisional hernias 26(61.9%) were in previous LSCS scars. 5 (11.9%) were in tubectomy scars; 5 (11.9%) occurred in hysterectomy scars, 4 (9.52%) in laparotomy scars and 2 (4.76%) in laparoscopy scars. Most common cause of incisional hernia was wound infection during previous surgery.

OPERATIVE PROCEDURE





Out of 76 ventral hernias 6 cases (7. 9%) were operated as emergency. 3 out of 6 Ventral Hernias—2 Umbilical and 1 Paraumbilical were anatomically repaired. Out of 42 Incisional hernias 3 cases (7.14%) were operated as Emergency, 2 were caused by previous hysterectomy and 1 by previous PS Which presented with Features of obstruction. The other 39 cases (92.85%) were operated electively with a mesh repair.

DISCUSSION

This present study has been compared to other series of similar nature, 76 cases of ventral hernia were taken up for this study which was done between April 2014 to September 2014.

Distribution of ventral hernia

This present study of 76 cases of ventral hernia had 42/76 cases (55.26%) of Incisional hernia, 7/76 cases (9.21%) of epigastric hernia and 17/76 (22.36%) of umbilical hernia, 9/76(11.84%) paraumbilical hernia. There was 1(1.31%) case of spigelian hernia. In S.M.Bose series (1999) of 175 cases 110 were incisional hernia(62.86%) 44 were umbilical hernias (25.13%), 21 cases were epigastric hernia (37.13%) 100% of all cases presented with swelling in the anterior abdominal wall, 18.26% presented with pain, 8.7% presented with features of obstruction with strangulation. This compares well with the S.M.Bose series (1999).

Epigastric hernia

In the present series 7 cases of epigastric hernia were studied which accounted to 9.21% of all ventral hernias.

SERIES PERCENTAGE

1 S.M.BOSE (1999) 12%

2 M.MOHAN RAO (1986) 9.86%

3 PRESENT SERIES 9.21%

The incidence of epigastric hernia in the present series is comparable with that of the M.MOHAN RAO series (36) and is slightly lower than S.M.BOSE series In this study of 7 cases of epigastric hernia 5 cases were male (71.4%). This agrees well with the Ponka series (38) which states that epigastric hernia is rarely seen in infants and children and is commonly seen in Males.

Clinical features

Pain was a presenting complaint in 57.14% of cases, swelling was a presenting Complaint in 100% of cases. There were no features of strangulation or obstruction and irreducibility in any of the cases studied. Pain may be due to herniation through a small defect.

Treatment and follow up

Among 7 cases of epigastric hernia all were treated with mesh repair. During the follow up period of 2 months none of the patients had recurrence.

Umbilical hernia and ParaUmbilical hernia:

Out of 76 cases 17 cases were umbilical hernia. Umbilical hernias contributed to 22.36% of all ventral hernias studied. This is slightly lower when compared with S.M.Bose series (1999) where umbilical hernia contributed to 25.13% of all ventral hernias. All cases of umbilical hernia presented with a swelling 100%.There was 2 cases with obstruction and was taken as emergency and anatomical repair was done.

Out of 76 cases 9 cases were paraumbilical hernia (11.84%). 3 were males and 6 were females. One of the female patients presented with features of obstructions and was taken as emergency and anatomical repair was done. The other 8 cases were managed electively with mesh repair

Treatment:

All non-obstructed cases of umbilical hernia and paraumbilical underwent mesh repair. One patient developed postoperative cough and was treated appropriately with antibiotics and chest physiotherapy. All 17+9 cases were followed for a period for 2 months during which no recurrence was noted.

AGE INCIDENCE OF INCISIONAL HERNIA

The highest incidence was seen in the 3rd, 4th and 5th decade more than 78.57% of cases were found in the age group of 30 – 60 years. This compares well with the Obney series which found that the peak incidence of 62% of incisional hernias occurred in the age group of 40-70 years.

Pre-disposing factors

In the present series maximum number of patients gave a history of wound. Infection following previous surgical procedure (59.52%). This is similar to the SMBose series where (53.63%) had wound infection as a predisposing factor. 30 cases were obese (39.57%) which concurs well with that of Branch series (1936) , (58%) . Percentages of other predisposing factors also correlated to that of SMBose series 1999.

SEX INCIDENCE AMONG INCISIONAL HERNIA

In this present series female predominance in the ratio of 1: 6 M: F ratio was Noted. This is higher when compared with the Akman series and Siedel series which were 1:4.8 and 1:3 respectively

Series Male: Female

1. Akman 1: 4.8

2. Siedel 1: 3

3. Present series 1: 6

This shows that incisional hernia occurs more commonly in females than in males.

Clinical features

Swelling was the presenting complaint in 100% of Incisional hernia cases. Pain was complained by 12 (28.57%) of patients. 3 patients (7.14%) presented with features of irreducibility with obstruction. Read and yonder reported that 17% of incisional hernias were operated for strangulation and obstruction.

Previous surgery preceding to incisional hernia

Gynecological procedures were the major contributing procedures for incisional hernia in the present series contributing to almost 85.7% of all cases followed by explorative laparotomy. This concurs well with that of the S.M.Bose series as the highest number of gynecological procedures are done in the infra umbilical region.

Treatment and follow up

In the present series 3 cases of incisional hernia were treated with anatomical repair since these patients presented with features of obstruction. The other 39 cases with onlay mesh repair. This concurs well with that of the SMBose series 1999. Post-operative wound infection was noticed in (19.04%) of cases. This is higher when compared with that of Lewis series (4%) and Usher series (6%). The wound infection was treated with appropriate antibiotics.

Follow up for complications

All 42 cases were followed for a period of 2 months. There was No recurrence at the end of the study with any kind of procedure be it anatomical repair or mesh repair.

Spigelian Hernia:

Spigelian hernia is a rare abdominal wall hernia that occurs between the fascia of anterior rectus abdominis, internal oblique and transverse abdominis muscle, being almost exclusively intercalated between layers of the abdominal wall. Of 76 cases described one was a Spigelian hernia. It was operated electively with mesh repair, contents were small bowel and mesentry. The patient was followed up for 2 months. There was no recurrence.

SUMMARY

- The male to female percentage distribution among ventral hernias was 28.94 % (22 cases) to 71.05 % (54 cases).
- The maximum incidence was noted in the 5th decade is 35.52 %.
- The commonest presenting complaint was a swelling in the anterior abdominal wall that is 100% of all cases studied.
- The commonest ventral hernia was incisional hernia which accounts for 55.26 % of all cases.
- Wound infection following previous operative procedure was the commonest precipitating factor for development of incisional hernias that is about 25 patients 59.52% of all incisional hernias.
- Obesity was the commonest precipitating factor among all ventral hernias studied that is about 30 patients 39.47% of all cases observed.
- Incisional hernia was found to occur commonly in females when compared to Males that is 85.71% to 14.29 %.
- Incisional hernias were found commonly in the midline and in the infra umbilical region.
- The commonest surgical procedures following which incisional hernia occurred were gynecological procedures that is 85.7 % of all cases. Among gynecological procedures the commonest procedure preceding to incisional hernia was caesarian section which accounted for 61.9 % of incisional hernia. The other procedures- hysterectomy 11.9% ,tubectomy 11.9%,laparotomy 9.52%,laparoscopy 4.76%.

- In epigastric hernias 9.21% all the cases were males 71.42% except two females 28.57%.

  In paraumbilical hernia 11.84% there were 3 males (33.33%) and 6 females (66.66%).
- In Umbilical hernias there were total 17 cases (22.36%). 7 were male (41.17%) patients and 10 were female (58.82%) patients.
- In spigelian hernia there was 1(1.31%) male patient. It was left sided spigelian hernia. The content of hernia sac was small bowel with mesentry. The patient was treated electively by mesh repair.
- Of all ventral hernias 76 patients, 6 patients (7.9%)-3 incisional, 2 umbilical, and 1 paraumblical hernias presented features of obstruction. These patients were taken for emergency surgery. Two incisional hernias contents were small bowel and the other was omentum. Of umbilical and paraumblical hernia the contents of hernia sac was omentum.
- Out of all ventral hernias 6 patients who were taken as emergency was treated with anatomical repair (7.9%). The other 70 patients (92.1%) were treated electively by mesh repair.
- All ventral hernias patients who underwent emergency and elective surgery were followed up for approximately 2 months. There was no recurrence reported.

CONCLUSION

- Good pre-operative evaluation and preparation; sound anatomical knowledge and meticulous attention to surgical detail are the most important factors for prevention of post-operative complications and recurrence of hernia.
- The commonest ventral hernia was incisional hernia and among previous operative procedures which resulted in incisional hernia, the most common were gynecological procedures
- Complications in ventral hernias were found to be minimal.
- In view of limited period follow up and a small sample size no comment could be made on recurrence rates, but when proper surgical procedures are adopted along with pre-operative correction of co-morbid factors, recurrence can be avoided.

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PROFORMA

Name:

Age: Sex: Occupation:

OP/IP no.:

HISTORY:

Swelling:

Duration:

Pain:

Loss of appetite/weight:

Lifting heavy weights:

H/o chronic cough / straining during defecation / micturition

PAST H/O: DM / SHT / hypothyroidism

PAST H/O SURGERIES: YES / NO

DETAILS:

TREATMENT H/O: Drug intake

PERSONAL H/O: Smoker / Alcoholic

FAMILY H/O:

OBSTETRIC H/O:

No of children:

Mode of birth:

PHYSICAL EXAMINATION:

General examination:

Built: Nourishment:

Anemia:

Local exam

Inspection:

Site:

Surface:

Extent:

Skin over the swelling:

Palpation:

Warmth:

Tenderness:

Site:

Shape:

Surface:

Cough impulse:

Reducibility:

Tone of abdominal muscles

PR:

EXAMINATION OF OTHER SYSTEMS:

PROVISIONAL DIAGNOSIS:

INVESTIGATIONS:

- BLOOD:
  - Hb
  - TC DC
  - ESR
  - Urea Creatinine Sugar
  - Electrolytes
  - THYROID FUNCTION TEST
- URINE
  - Albumin
  - Sugar
- X ray chest PA
- Abdomen x ray
- Usg abdomen

- CT abdomen

TREATMENT:

POST OP:

FOLLOW UP:

INDEX FOR MASTER CHART

- LSCS – LOWER SEGMENT CAESAREAN SECTION
- EMG LAP – EMERGENCY LAPROTOMY
- PS – PEURPERAL STERILIZATION
- HYST – HYSTERECTOMY
- WI – WOUND INFECTION
- LRI – LOWER RESPIRATORY INFECTION
- M – MESH REPAIR
- MULTI – MULTIPARA
- S – SWELLING
- OBS – OBSTRUCTION
- OB – OBESITY
- AN – ANAEMIA
- COPD – CHRONIC OBSTRUCTIVE PULMONARY DISEASE
- HYPO – HYPOTHYROIDISM
- AR – ANATOMICAL REPAIR
- R & A – RESECTION & ANASTOMOSIS

MASTER CHART - INCISIONAL HERNIA

S. NO	AGE	SEX	BMI	IP	PREVIOUS SURGERY	ETIOLOGY	PRESENTATION	DURATION AFTER PREVIOUS SURGERY	CO MORBID	TREATMENT	COMPLICATION	POST OP STAY	RECURRENCE
1	28	F	28	8020	2LSCS	WI	S/PAIN	1.5		M	-	8	-
2	29	F	27	8435	LSCS	WI	S	2	AN	M	-	9	-
3	25	M	29	15559	EMG LAP	WI	S	2	-	M	-	10	-
4	25	F	31	1470704	LSCS	WI	S/PAIN	1.5	OB	M	-	11	-
5	28	F	27	1423770	PS	-	S	4	-	M	-	9	-
6	29	F	32	1413267	PS	WI	S	1.5	OB/HYPO	M	-	11	-
7	26	F	28	1414068	LSCS	-	S	2.5	-	M	-	10	-
8	33	F	32	9330	LSCS	WI/LRI	S	3	OB	M	-	12	-
9	35	F	33	16289	PS	-	S	2.5	OB/HYPO	M	-	11	-
10	32	M	27	16298	LAP	WI	S/PAIN	3	AN	M	INF	13	-
11	38	F	28	7554	EMGLAP	WI	S	4	AN	M	-	11	-
12	31	F	32	16769	2 LSCS	-	S	5	OB	M	INF	14	-
13	38	F	29	1410773	HYST	WI	S	3	-	M	-	12	-
14	39	F	33	1426882	LSCS	WI	S/PAIN	6	OB	M	-	13	-
15	36	F	26	1413233	LSCS	-	S	4	-	M	-	9	-
16	39	F	31	1416231	LSCS	WI	S	5	OB	M	-	12	-
17	47	F	31	9418	HYST	WI	OBS	4.5	OB/DM	AR	-	11	-
18	45	F	29	16578	LSCS	-	S	3	DM	M	-	10	-
19	45	F	30	17661	PS	-	S	4	OB	M	INF	12	-
20	40	F	33	1427043	LSCS	WI	S/PAIN	5	OB/DM	M	-	11	-
21	49	M	29	1410899	LAP	-	S/PAIN	4.5	DM	M	INF	14	-

MASTER CHART - INCISIONAL HERNIA

S.NO	AGE	SEX	BMI	IP	PREVIOUS SURGERY	ETIOLOGY	PRESENTATION	DURATION AFTER PREVIOUS SURGERY	CO MORBID	TREATMENT	COMPLICATION	POST OP STAY	RECURRENCE
22	48	M	30	1419987	LAP	WI	S	5	-	M	-	11	-
23	47	F	32	1416276	LSCS	-	S	6	DM	M	-	10	-
24	49	F	32	1411732	LSCS	WI	S	4	OB	M	-	10	-
25	43	F	29	1414209	LSCS	-	S	6	COPD	M	-	9	-
26	47	F	31	1416376	LSCS	WI	S	2	OB	M	INF	12	-
27	45	F	29	1418506	LSCS	-	S	3.5	DM	M	-	10	-
28	47	F	32	1418108	LSCS	-	S/PAIN	3	OB/DM	M	INF	14	-
29	48	F	26	17686	LSCS	-	S	4	AN	M	-	11	-
30	44	F	29	16638	LSCS	WI	S	2.5	-	M	-	10	-
31	56	F	33	6832	HYST	-	S	4	OB/DM	M	INF	15	-
32	58	F	30	8723	2LSCS	-	S/PAIN	5	OB	M	-	12	-
33	50	F	29	15636	PS	WI	OBS	3	OB/DM	AR	INF	13	-
34	51	M	33	8824	LAP	WI	S/PAIN	4	OB/DM	M	-	12	-
35	52	F	32	1413120	HYST	WI	S	6	OB	M	INF	14	-
36	53	F	29	1419947	LSCS	WI	S	5	-	M	-	10	-
37	50	M	32	1408568	LAP	-	S/PAIN	4	OB/DM	M	-	12	-
38	56	F	31	16648	LSCS	WI	S	2.5	OB	M	-	10	-
39	57	F	28	16296	LSCS	WI	S/PAIN	4	-	M	-	9	-
40	52	F	29	17792	LSCS	-	S	4.5	DM	AR	INF	12	-
41	65	F	33	8927	HYST	-	S	4	OB/DM	M	INF	17	-
42	68	F	31	18070	2LSCS	WI	S	5	OB/DM/AN	M	INF	13	-

MASTER CHART – EPIGASTRIC HERNIA

S No	Age	Sex	IP No	Chief Complaints	Treatment	complications	Co morbid	Post op stay	Recurrence
1.	27	M	17531	PAIN/SWELLING	M	-	-	6	-
2.	47	M	17031	PAIN/SWELLING	M	-	-	8	-
3.	30	F	11822	SWELLING	M	-	-	5	-
4.	35	M	14021	PAIN/SWELLING	M	-	-	7	-
5.	24	M	16545	PAIN/SWELLING	M	-	-	6	-
6.	41	M	17644	SWELLING	M	-	-	7	-
7.	53	M	12962	SWELLING	M	INF	DM	10	-

MASTER CHART - PARAUMBLICAL HERNIA

S.No	AGE	SEX	BMI	IP NO	COMPLAINTS	TREATMENT	COMPLICATION	CO MORBID	POST OP STAY	RECURRENCE
1.	45	F	33	14091461	SWELLING	M	-	OB	8	-
2.	37	M	29	11970	SWELLING	M	-	-	6	-
3.	30	F	31	1425565	PAIN/SWELLING	M	INF	OB	9	-
4.	42	F	34	1426412	OBSTRUCTION	EMERG A R	INF	DM/OB	11	-
5.	62	F	30	1426881	PAIN/SWELLING	M	-	DM/HT/OB	12	-
6.	48	M	29	13560	PAIN/SWELLING	M	-		8	-
7.	46	M	27	11632	SWELLING	M	-	-	9	-
8.	64	F	32	1426004	PAIN/SWELLING	M	SEROMA	DM/HT/OB	10	-
9.	28	F	27	18101	SWELLING	M	-	-	7	-

MASTER CHART – UMBLICAL HERNIA

S No	Age	Sex	BMI	IP No	Chief Complaints	Treatment	Complication	Co morbid	Post op stay	Recurrence
1	47	M	27	141O899	SWELLING	MESH REPAIR	-	-	8	-
2	45	M	31	1412020	PAIN/SWELLING	MESH REPAIR	-	-	9	-
3	36	F	26	17320	PAIN/SWELLING	MESH REPAIR	-	-	7	-
4	37	M	28	17668	PAIN/SWELLING	MESH REPAIR	INF	-	8	-
5	47	F	29	17544	PAIN/SWELLING	MESH REPAIR	-	OB	10	-
6	35	M	32	17572	PAIN/SWELLING	MESH REPAIR	LRI/INF	OB	12	-
7	46	M	29	17632	PAIN/SWELLING/ OBSTRUCTION	EMERGENCY AR	-	HYPO/AN	14	-
8	25	F	24	14140650	SWELLING	AR	-	OB	7	-

MASTER CHART – UMBLICAL HERNIA

9	27	F	26	1419717	SWELLING	MESH REPAIR	INF	HYPO	8	-
10	66	M	32	1410899	PAIN/SWELLING/ OBSTRUCTION	EMERGENCY AR	-	OB	14	-
11	48	M	29	1416773	SWELLING	MESH REPAIR	INF	-	9	--
12	72	M	30	17261	SWELLING	MESH REPAIR	LRI	DM	12	-
13	63	F	33	1420802	PAIN/SWELLING	MESH REPAIR	INF	OB/DM	14	-
14	47	M	30	17639	SWELLING	MESH REPAIR	-	-	8	-
15	49	M	28	17560	SWELLING	MESH REPAIR	-	-	7	-
16	64	F	31	17697	PAIN/SWELLING	MESH REPAIR	INF	OB/DM	13	-
17	56	F	32	17067	PAIN/SWELLING	MESH REPAIR	-	HYPO	12	-

MASTER CHART – SPIGELIAN HERNIA

S.NO	AGE	SEX	BMI	IP.NO	CHIEF COMPLAINTS	TREATMENT	COMPLICATION	CO MORBID	POST OP STAY	RECURRENCE
1	69	M	32	8868	PAIN/SWELLING	MESH REPAIR	-	DM/HT/OB	12	-